DEPARTMENT OF THE INTERIOR

Bureau of Land Management

SFUND RECORDS CTR

88220588

COUNTY OF RIVERSIDE

Planning Department

4726
Vol 2

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT

FOR THE PROPOSED

EAGLE MOUNTAIN LANDFILL PROJECT

JULY 1991

United States Department of the Interior

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BUREAU OF LAND MANAGEMENT
PALM SPRINGS-SOUTH COAST RESOURCE AREA
400 S. FARRELL DRIVE, SUITE B-205
PALM SPRINGS, CALIFORNIA 92262

IN REPLY REFER TO

JUN 19 1991

Dear Reviewer:

Enclosed for your review and comment is the Draft Environmental Impact Statement and Report (EIS/EIR) and its appendices and the Riverside County Specific Plan #252 for the Eagle Mountain Landfill Project. The project would be located in the Eagle Mountain Mine area of Riverside County. The purpose of this Draft EIS/EIR is to provide the most current information on the probable environmental and social impacts that would result from the proposed landfill, and the most up-to-date plans for environmental mitigation.

To facilitate review, the Draft EIS/EIR has been prepared to meet Federal requirements of the National Environmental Policy Act, and State requirements of the California Environmental Quality Act. The document has been prepared by Regional Environmental Consultants (RECON) of San Diego, California, under the direction of the Bureau of Land Management and Riverside County.

Comments concerning the adequacy of this document will be considered in preparation of the Final EIS/EIR. A sixty (60) day comment period has been established for this document. Written comments on this document will be accepted through September 17, 1991, and should be addressed to:

Bureau of Land Management
Palm Springs-South Coast R.A.
63-500 Garnet Ave.
P.O. Box 2000
N. Palm Springs, CA 92258-2000

We appreciate your interest in your public lands, and your commitment to participating in this review process.

Sincerely,

Russell L. Kaldenberg
Area Manager

TAKE PRIDE IN AMERICA

DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT
FOR THE
EAGLE MOUNTAIN LANDFILL PROJECT
Specific Plan #252
State Clearinghouse No. 8908413

Applicant

KAISER STEEL RESOURCES, INC.
and
MINE RECLAMATION CORPORATION

Prepared for

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Ed Hastey 6/18/91
Ed Hastey — Date
California State Director

COUNTY OF RIVERSIDE
PLANNING DEPARTMENT

Joseph A Richards 6/11/91
Joseph A. Richards — Date
Planning Director

BLM-CA-PT-91-015-2200

This document printed on recycled paper.

Eagle Mountain Landfill Project, Riverside County, California
Federal Land Exchange and Right-of-Way Approval
County General Plan Amendment and Specific Plan
Draft Environmental Impact Statement/Environmental Impact Report

Lead Agencies:

U.S. Department of the Interior
Bureau of Land Management
California Desert District
Palm Springs–South Coast Resource Area

County of Riverside
Riverside, California

Cooperating Agencies:

National Park Service
Joshua Tree National Monument

Bureau of Mines
Western Field Operation Center

Prepared By:

RECON
Regional Environmental Consultants
Job Number 2100E

For Information Contact:

Marianne Wetzel
Bureau of Land Management
400 S. Farrell Drive, Suite B-205
Palm Springs, CA 92262
(619) 323-4421

David Mares
County of Riverside
4080 Lemon Street, 9th Floor
Riverside, CA 92501
(714) 275-3290

Abstract:

The Eagle Mountain Landfill Project is a proposed Class III nonhazardous solid waste landfill in an unused open pit mine located at Eagle Mountain in northeastern Riverside County, California. Eagle Mountain is located in the California Desert Conservation Area. The project site is comprised of about 4,695 acres of federal and patented lands. Under the Federal Land Policy and Management Act (FLPMA), about 3,271 acres of Bureau of Land Management (BLM) lands will be transferred to Kaiser Steel Resources, Inc., in exchange for land currently owned by Kaiser Steel Resources, Inc. The BLM lands are necessary for the operation of the landfill and the Kaiser lands contain desirable quality wildlife habitat on the Chuckwalla Bench. Also, a new FLPMA right-of-way would be issued for the entire length of the Eagle Mountain rail line, the existing Eagle Mountain Road, and the proposed Eagle Mountain Road Extension, which begins just south of the Metropolitan Water District (MWD) pumping station.

The landfill itself will comprise 2,272 acres. At full-scale operations, the landfill will accept an inflow of up to 20,000 tons of solid waste per day from throughout southern California

for approximately 115 years. Of this total, 16,000 tons per day will be shipped in containers along the Southern Pacific main line to a rail junction at Ferrum, from which it will be transported along the 52-mile Eagle Mountain rail line to the project site. A total of 4,000 tons per day of containerized waste will be delivered by truck. The project will be served by a network of rail and truck transfer stations to be located throughout southern California.

The Eagle Mountain Landfill Specific Plan amends the Riverside County General Plan and Zoning Ordinance and Map to facilitate initiation of a landfill operation at the Eagle Mountain iron ore mine site. The Specific Plan zone is being created to support the addition of landfill and associated land uses on the project site. The design of the landfill includes the use of a liner on the bottom and side slopes of the pit; a leachate collection, recovery, and treatment system; and a gas collection system. Measures for dust control and a number of other planning and monitoring requirements would also be included in the project. All on-site drainage improvements for protection of run-on into the landfill will be sized to accept 100-year flows. The Specific Plan discusses the relationship of these activities to the project.

The project would contribute particulates and vehicle emissions to the Southeast Desert and South Coast air basins, a cumulative impact which cannot be mitigated. All other potential adverse impacts to the environment either would not be significant or would be mitigated below a significant level through design aspects of the project, implemented either prior to construction of the project or as conditions of county, state, and federal permits applicable to the project.

Other Federal and State Actions:

Endangered Species Act, Section 7 consultation between Bureau of Land Management and U.S. Fish and Wildlife Service
Clean Water Act, Section 404 permit from U.S. Army Corps of Engineers
Solid Waste Facilities Permit from the County of Riverside Department of Health (the Lead Enforcement Agency) and certification by the California Integrated Waste Management Board
California Department of Fish and Game Code, Section 1603 agreement
Discharge Requirements from the Lower Colorado River Regional Water Quality Control Board
Authority to Construct/Permit to Operate from the South Coast Air Quality Management District
Compliance with Section 106 of the National Historic Preservation Act

Issued: July 19, 1991

Last Date for Receipt of Public and Agency Comments: September 17, 1991

Figures

Figures (cont.)

Figures (cont.)

*Denotes oversized (11" x 17") graphics.

Tables

Tables (cont.)

Executive Summary

I. Purpose of This Document

This draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) addresses the potential impacts and mitigation measures for the Eagle Mountain landfill project. The federal lead agency with responsibility for the project is the Bureau of Land Management (BLM), and the state lead agency is the County of Riverside. This draft EIS/EIR has been prepared pursuant to the requirements of the National Environmental Policy Act (NEPA), which apply to the federal actions, and the California Environmental Quality Act (CEQA) which apply to the state and County actions. In the preparation of this report, the format specifications of NEPA have been followed, with minor modifications to include discussions required by CEQA. Table S-1 illustrates the correspondence between the contents of this report and the discussions required by CEQA.

II. Proposed Action

Mine Reclamation Corporation proposes to develop a Class III nonhazardous solid waste landfill which would accommodate up to 20,000 tons per day (tpd). The landfill site would be located in an unused iron ore open pit mine at Eagle Mountain in northeastern Riverside County, California. The existing mine at Eagle Mountain is located on approximately 4,695 acres, of which 2,280 acres are under public ownership. These public lands will be transferred out of federal ownership to Kaiser Steel Resources, Inc., in exchange for lands owned by Kaiser along the existing Eagle Mountain railroad. The project includes the conversion of the railroad right-of-way granted to Kaiser Steel for mining uses between Ferrum Junction on the northeast coast of the Salton Sea and Eagle Mountain. This rail line is approximately 52 miles long, 32 miles of which exist on a legislatively authorized right-of-way, and would be used to transport waste-filled containers from the Southern Pacific line at Ferrum Junction to the project site. A new rail spur, approximately two miles long, would be built from the Eagle Mountain rail line to a container handling yard located adjacent to the southeast portion of the landfill site.

Waste received by truck would access the site via an extension of the existing Eagle Mountain Road and an existing on-site haul road. A new Federal Land Policy and Management Act (FLPMA) right-of-way would be issued over the entire length of the existing, legislatively authorized Eagle Mountain rail line right-of-way, the existing Eagle Mountain Road, and the Eagle Mountain Road Extension which begins just south of the Metropolitan Water District pumping station. The existing Kaiser Truck Trail legislatively authorized right-of-way would

TABLE S-1
CROSS REFERENCE FOR CEQA CONTENTS

CEQA Guidelines Section	Topic	Location in this EIR/EIS
15122	Table of Contents or Index	Table of Contents and this table, and in Introduction
15123	Summary	Executive Summary and Tables S-1 and S-2 (precedes Introduction)
15124	Project Description	
	a. Location and Boundaries	Section I.B. - Location
	b. Statement of Objectives	Section I.A. - Purpose and Need
	c. Technical Characteristics	Section II.A. - Proposed Action, and throughout topic discussions in Section IV., as necessary
	d. Uses of EIR	Section I.D. - Authorizing Actions
15125	Environmental Setting	Section III. - Environmental Setting, and throughout topic discussions in Section III.
15126	Environmental Impact	
	(a) Significant Effects	Section IV. - Impacts and Mitigation Measures for the Proposed Action and the Alternatives
	(b) Significant Effects Which Cannot Be Avoided	Throughout Section IV., and Summary
	(c) Mitigation Measures	Throughout Section IV., and Summary
	(d) Alternatives	Sections II.B. through II.H.
	(e) Short-Term/Long-Term	Section VI.
	(f) Significant Irreversible Changes	Section VII.
	(g) Growth-Inducing Impacts	Section IV.H., Growth Inducement and Socioeconomics
15128	Effects Not Significant	Noted in each topic in Section IV.

TABLE S-1
CROSS REFERENCE FOR CEQA CONTENTS
(continued)

CEQA Guidelines Section	Topic	Location in this EIR/EIS
15129	Organizations and Persons Consulted	Section VIII., List of Preparers
15130	Cumulative Impacts	Section V.
15131	Economic and Social Effects	Sections IV.H. and V.

be abandoned. Additionally, the Eagle Mountain Landfill Specific Plan would amend the Riverside County General Plan and the Zoning Ordinance and Map to facilitate initiation of a landfill operation at the Eagle Mountain Mine site.

Several off-site solid waste processing and transfer stations (materials recovery facilities, or MRFs) will be necessary to serve the landfill; however, they are not part of the proposed action and are not discussed in detail in this draft EIS/EIR.

All federal, state, and county standards regarding design, construction, and operation of the landfill would be incorporated into the project. These include requirements for lining the bottom and sides of the East Pit and other ground surfaces before placing refuse and installation of systems for collection, recovery, monitoring, and treatment of landfill gas and leachate that may be produced during the life of the project. Mitigation measures for dust control and many other planning and monitoring requirements would be included in the project. Closure procedures and post-closure monitoring and funding would be provided by the project.

The project would also provide for the transport and temporary storage of recyclable materials collected at MRFs.

III. Actions Covered

Actions identified and covered by this EIS/EIR include:

1. Bureau of Land Management land exchange and right-of-way grant pursuant to the FLPMA.

2. County of Riverside General Plan Amendment, Zone Change, and Specific Plan adoption for purposes of establishing the landfill and associated uses. The Mine Reclamation Plan approved in 1978 must be revised and a Development Agreement approved.

3. Subsequent permits and actions necessary to implement the landfill and rehabilitation of the existing railroad and truck road, including a solid waste facilities permit to be issued by the Riverside County Department of Health (the Lead Enforcement Agency) and the California Integrated Waste Management Board, waste discharge requirements to be issued by the Colorado River Regional Water Quality Control Board, and Authority to Construct and Permit to Operate for the landfill gas disposal system to be granted by the South Coast Air Quality Management District.

4. Consultation with the U.S. Fish and Wildlife Service required by Section 7 of the Endangered Species Act, because the proposed land exchange and resumption of intensive use of railroad operation could affect populations of federally listed endangered species (desert tortoise and desert pupfish).

5. An agreement (pursuant to Section 1603 of the California Fish and Game Code) with the California Department of Fish and Game for the alteration of any streambed. Likewise, a Memorandum of Understanding under the California Endangered Species Act, California Fish and Game Code Section 2081.

6. Compliance with Section 106 of the National Historic Preservation Act.

7. A possible Section 404 permit from the U.S. Army Corps of Engineers.

IV. Actions Not Covered

Several related discretionary actions are identified but not covered by this draft EIS/EIR. They include:

1. County of Riverside General Plan Amendment, Zone Change, and Specific Plan adoption for purposes of establishing the townsite of Eagle Mountain and its associated activities would be required.

2. Operation of the project would depend on the transfer of waste from a system of MRFs or processing and transfer stations located throughout the areas served by the landfill. Some of these exist and others would be developed in the future. Each of these stations requires its own local land use permit (a conditional use permit in most cases) and its own solid waste facilities permit. These actions associated with the off-site transfer stations are not covered by this draft EIS/EIR.

3. Limited mining activities may continue during proposed landfilling operations. These mining activities have not been assessed in this draft EIS/EIR and may require additional NEPA/CEQA environmental review and agency approval.

V. Alternatives Considered in Detail

In addition to the proposed action, the following project alternatives are considered in detail within this draft EIS/EIR. Within each environmental topic discussed, their impacts are compared with that of the proposed project.

A. Reduced Landfill Operations Alternative

This alternative would allow for the disposal of up to 16,000 tpd in a reduced landfill area. The reduced landfill area would be the same as the proposed project's area less those areas containing the deepest portions of the East Pit. It would allow for the disposal of 14,000 tpd by rail and 2,000 tpd by truck. Truck traffic is included in this alternative to enable the project to serve potential future demand in Riverside County which cannot be economically served by rail transportation.

This alternative would have the effect of reducing the capacity of the landfill by approximately 20 percent compared to the proposed project. However, at an inflow of 16,000 tpd, the potential 115-year site life of the project would not be reduced.

B. Proposed Action with Rail Access Only Alternative

This alternative would limit the project to 16,000 tpd of solid waste, delivered by rail only. It would avoid the effects attributable to the 200 truck deliveries per day, but it would also remove some of the operational flexibility of the project. Communities without rail service either could not use the proposed landfill or would have the extra cost of providing truck transport to a transfer station with rail access.

C. No Project Alternative

This alternative would leave the project area in its present disturbed condition and avoid the potential effects of the proposed landfill. It would require continued reliance on existing or new landfills in southern California.

VI. Impacts That Cannot Be Mitigated

The air quality effects of the project are considered a significant impact. The increases in air emissions in the South Coast Air Basin resulting from the long- distance transport of solid waste and the incremental increase of emissions in the Southeast Desert Air Basin cannot be entirely avoided.

VII. Summary of Project Impacts, Mitigation, and Monitoring

Table S-2 summarizes the environmental effects of the proposed project and alternatives. Each environmental issue listed in the Table S-2 is separated into sub-issues and evaluated by sub-issue. The summary table describes potential impacts resulting from the proposed project and alternatives, recommended mitigation measures, and resulting level of significance after implementation of recommended mitigation measures.

VIII. Summary of Cumulative Impacts

Impacts occurring as a result of cumulative projects in the vicinity of the proposed Eagle Mountain landfill operation depend on future uses of the area, such as the possible resumption of mining activity. Regionally, continued residential development in and around Blythe and continued development of utilities are anticipated. Increased air emissions in both the South Coast Air Basin and the Southeast Desert Air Basin would be the most significant cumulative effect resulting from the proposed project and projects of a regional nature.

Implementation of the landfill project is not anticipated to contribute to any cumulative impacts other than those associated with degradation of air quality, desert tortoise population fragmentation, habitat loss for Alverson's foxtail cactus and California barrel cactus, increased regional water consumption, and visual character of adjacent wilderness areas. However, the only cumulative impact considered significant after mitigation is to air quality, because the project is located in a nonattainment air basin. A summary of these impacts may be found at the end of Table S-2.

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
WATER QUALITY				
Groundwater Quality				
Impacts	Potential degradation of groundwater due to migration of leachate	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Install liner; install leachate collection system; control landfill gas (LFG) by LFG recovery; install detection monitoring wells	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Surface Water Quality				
Impacts	Potential pollution of surface waters due to contact with refuse	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Install drainage collection system	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Groundwater Use and Supply				
Impacts	Will increase overdraft of aquifer; however, based on aquifer reserves, not considered a significant impact	Reduces the capacity of the project by 20 percent with a 10 percent reduction in water use	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	None required	None required	None required	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
PUBLIC HEALTH AND SAFETY				
Hazardous Wastes				
Impacts	Potential for exposure to hazardous wastes at transfer stations, material recovery facilities and working face of landfill	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Inspect and screen refuse for hazardous wastes at transfer or materials recovery stations, or at an on-site inspection station; remove hazardous waste for disposal at appropriate hazardous waste sites	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Landfill Gas				
Impacts	Potential hazards due to accumulation of landfill gas (LFG)	Same as proposed action	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Install LFG recovery/ utilization and migration control system, permanent subsurface LFG monitoring wells near structures, and combustible gas sensors in building interiors	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Fires				
Impacts	Potential for subsurface landfill fires, surface fires, refuse fires, and fires along right-of-way	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Properly operate and maintain the landfill gas collector system; incorporate staged response for control of subsurface fires into the emergency response plan; retain large watering trucks and earth-moving equipment for on-site emergency response capabilities; regularly inspect and remove vegetation which may pose a fire hazard on right-of-way	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Vectors and Disease				
Impacts	Potential for landfill to be used by animals, birds, and insects for foraging and/or breeding may result in an increased potential for disease	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Place earthen material over the refuse on a daily basis	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Worker Safety				
Impacts	Potential exposure to noise, dust, odors, landfill gas, and unsafe materials	Same as proposed action	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Develop a standard set of procedures for employee handling of refuse, including use of personal protective equipment, use of enclosed cabs on heavy equipment, rotation of worker assignments, and adequate supervision of personnel; exposure to LFG will be controlled by the collection and disposal system for LFG	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
<u>Public Safety</u>				
Impacts	Public exposure to nonhazardous waste resulting from truck and rail accidents	Slightly less than proposed action	Eliminate potential for truck accidents	No impact
Mitigation Measures	Establish an emergency response plan with adequate staff either on-site or on-call for any clean-up efforts required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
TRAFFIC AND TRANSPORTATION				
Rail Operations				
Impacts	No significant impacts were identified for the proposed action	Slightly less than proposed action (10 daily one-way trains instead of 12)	Same as proposed action	No impact
Mitigation	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
At-Grade Crossings				
Impacts	Surface street vehicular traffic will incur slight delays at at-grade rail crossings; at-grade crossing hazards will be increased slightly	Rail operations will be reduced (10 daily one-way trains instead of 12)	Same as proposed action	No impact
Mitigation Measures	Conduct rail service at night to minimize conflicts with vehicular traffic; install flashing lights to notify drivers and pedestrians of approaching trains at rail crossing at Kaiser Road	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Truck Traffic on Streets				
Impacts	Approximately 200 one-way truck shipments would occur per day; Eagle Mountain Road Extension would create a roadway crossing at Kaiser Road, which serves the community of Eagle Mountain, including local school	Truck traffic is reduced by half	There will be no impacts due to truck traffic	No impact
Mitigation Measures	Install stop signs at roadway crossing of Eagle Mountain Road Extension and Kaiser Road	Same as proposed action	None required	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
AIR QUALITY				
Emissions				
Impacts	Degradation of air quality due to increased emissions in both the South Coast Air Basin and the Southeast Desert Air Basin due to increased emissions from motor vehicles, including train locomotives, on-highway haul trucks, and off-highway heavy equipment	Less truck and rail traffic will result in decreased emissions	Use of rail only will result in decrease in emissions	Continued degradion of air quality in South Coast Air Basin from use of existing or new landfills

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Shut down diesel locomotives when engines are not needed for one hour or more; use diesel fuel and engines certified by the California Air Resources Board; install energy recovery or pollution equipment when warranted for LFG equipment; monitor meteo-rological conditions for at least 12 months and update air quality modeling and mitigation strategies; incorporate other control measures as required by ARB/APCD	Same as proposed action	Same as proposed action	None available
Significance after Mitigation	Impacts will not be reduced below a level of significance	Impacts will be less than the proposed project but not reduced below a level of of significance	Impacts will be less than proposed project but not reduced below a level of significance	Continued significant impacts in South Coast Air Basin and Southeast Desert Air Basin
<u>Ambient Concentrations</u>				
Impacts	Pollutant concentrations at typical rail crossings are not significant; exceeds state standards for NOx and state and federal standards for PM10 at the landfill site; exceeds increments at Joshua Tree National Monument boundary for NO, SOx, and PM10	Slightly reduced emmissions from proposed action	Similar to reduced operations alternative	No impact to SEDAB

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Same measures as for emissions from proposed action identified above	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Impacts will not be reduced below a level of significance	Impacts will be less than proposed project but not reduced below a level of significance	Impacts will be less than proposed project but not reduced below a level of significance	No impact to SEDAB
Health Risk Assessment				
Impacts	Potential for increased health risk to area residents due to exposure to LFG	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Interception and removal of hazardous wastes within waste stream; reanalysis of impacts using actual weather data to identify additional mitigation measures, if necessary, as part of the Report of Disposal Site Information	Same as proposed action	Same as proposed action	No impact
Significance after Mitigation	Impacts will not be reduced below a level of significance	Impacts will be less than proposed project but not reduced below a level of significance	Impacts will be less than proposed project but not reduced below a level of significance	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Consistency with Regulatory Programs				
Impacts	Statuatory requirements ensure consistency with regulatory programs	Same as proposed action	Same as proposed action	None required
Mitigation Measures	Application, permit review, imposition of control conditions, approval, and inspection processes of the SCAQMD will serve to enforce consistency	Same as proposed action	Same as proposed action	None required
Signifcance after Mitigation	Not significant	Not significant	Not significant	None required
LAND USE				
Existing Uses				
Impacts	Minimal interference with iron ore reserves, but not considered a significant impact	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Surrounding Uses				
Impacts	Potential impacts to existing residential use and correctional facility	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Restrict truck traffic to designated roads; maintain minimum 25-foot setback and maximum 60-foot height for all project buildings; maintain berms to partially obscure views onto project site; control fugitive dust; install sound attenuating walls as needed	Same as proposed action	Not significant	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Consistency with Plans and Policies				
Impacts	The project would require a BLM land exchange and County General Plan amendment and zone change to make the project consistent with existing plans	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
DRAINAGE				
Impacts	Potential drainage impacts to the East Pit, townsite, and alluvial areas east of the project site	Same as proposed action	Same as proposed action	Continued inadequate drainage at the East Pit, townsite, and alluvial areas east of the project site
Mitigation Measures	Install perimeter drainage system; slope final landfill not greater than 3 percent	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
BIOLOGY				
Desert Tortoise				
Impacts	Permanent loss of individuals and habitat, potential increased raven predation, potential harassment of individuals (noise and vibration)	Same as proposed action	Avoids permanent loss of habitat (widening of Eagle Mountain Road), and impacts from truck traffic; other potential impacts similar to proposed action	No impact
Mitigation Measures	Survey and monitor prior to and during construction/ maintenance, relocate individuals from railroad bed; install culvert system and protective fence; preserve off-site habitat; raven control and monitoring; worker education	Same as proposed action	Same as proposed action but delete off-site preservation	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Bighorn Sheep				
Impacts	Loss of 4 water sources and habitat; potential indirect effects from measured residential population; potential disruption of sheep movement	Impacts would be slightly reduced	Same as proposed action	No impact
Mitigation Measures	Install three permanent water sources far from mine site to encourage bighorn sheep to use surrounding natural areas; these sites and their design to be approved by biologists at BLM and CDFG; rehabilitate Buzzard Springs and clear of tamarisk; if sheep are not naturally expanding their ranges to incorporate new sources, translocate them; preserve buffer habitat areas around landfill (644 acres); monitor sheep movement; conduct employee awareness program	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Desert Pupfish				
Impacts	Potential impacts from rail accident or major construction on trestle over habitat	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Annually monitor pupfish (by CDFG); if major construction is necessary, incorporate protective measures in plans and monitor construction/maintenance activities; include biologist on emergency response team and restore any habitat disturbed by accident	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Other Sensitive Wildlife				
Impacts	Potential loss of California leaf-nosed bat roosting areas hibernacula; increased raven predation on Eagle Mountain scrub jay	Slight reduction on overall habitat loss	Same as proposed action	No impact
Mitigation Measures	Monitor bat roost sites; maintain adit opening; monitor and control ravens	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Sensitive Plant Species				
Impacts	Loss of 158 acres of foxtail cactus habitat	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Preserve 157 acres of foxtail cactus on-site; initiate transplant program for lost cacti on suitable areas within project boundary; monitor transplants once a month for one growing season; submit monitoring report to BLM, CDFG, and USFWS	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Major Washes and Drainages				
Impacts	No significant impacts to wetlands are anticipated to occur from this project	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
GROWTH INDUCEMENT AND SOCIOECONOMICS				
Growth Inducement				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impacts
Mitigation Measures	None required	Same as proposed action	Not significant	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Socioeconomics				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impacts
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
GEOLOGY				
Soils and Geology				
Impacts	Potential exists for settlement within alluvial soils, for expansive soils, and for surficial instability	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Identify expansive soils in alluvial material within the landfill footprint and regrade, as necessary; determine the safe slope angles and maintain slopes	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
	within this range; identify need to flatten slopes or construct fill buttresses; excavate and/or recompact unsuitable soils prior to liner construction; place liner against safe slope angles			
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Seismicity				
Impacts	Potential ground shaking	Same as proposed action	Same as proposed action	No impacts
Mitigation Measures	Progressively scale loose rock and materials on benches immediately above the working face of the landfill, and construct berms to intercept fallen rock	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Mineral Resources				
Impacts	Potential loss of recoverable iron ore reserves	Approximate 50 percent reduction of proposed project's impacts	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Sequence landfill operations so as to impact mineral resources last to allow for recovery prior to impact	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
VISUAL, RECREATION, AND WILDERNESS				
Visual Contrast				
Impacts	Potential for increased visual contrast	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Blend the topographic contours of the landfill with adjacent landforms, and minimize color and tone contrast of the final cover; revegetation of the landfill will further reduce visual contrast impacts	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Same as proposed action	Same as proposed action	None required
Views from Desert Center and Other Key Observation Points				
Impacts	No significant impact	Same as proposed action	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Same as proposed action	Same as proposed action	None required
Views from Eagle Mountain Townsite				
Impacts	The proposed action will have a significant impact on the views from the community of Eagle Mountain; however, that impact will not be visible for several decades; visual contrast will be decreased over time	The reduction in size and scale of the landfill would serve to reduce visual impact as compared to the proposed action	Incremental improvement over proposed action	Currently, the views from the community are significantly impacted by the imposing tailing pile, the exposed slopes, and scarred areas; this high level of impact would remain
Mitigation Measures	Phase project, revegetate disturbed areas, and revitalize community	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	A significant impact is associated with this alternative
Windblown Debris and Dust				
Impacts	Potential for windblown debris and dust	Same as proposed action	Same as proposed action	No impact

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Mitigation Measures	Transport all refuse materials to the site and to the face of the landfill in closed containers, compacted and covered on a daily basis; water haul roads regularly; install fencing and regularly patrol for litter retrieval; develop an active storm and early warning procedure for extremely windy conditions and response plan to ensure timely and complete cleanup of accidental spills	Same as proposed action	Incremental improvement over proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
<u>Night Lighting</u>				
Impacts	Potential for visually impacting the surrounding area by night lighting	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Limit landfill activities other than the container handling operation, to daylight hours; provide low-pressure sodium safety and	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
	security lights; direct lighting downward to light only the immediate area			
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Recreation				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Wilderness				
Impacts	Indirect impacts associated with increased activity visible from WSAs	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Location and design of landfill and reduction of visual contrast	Same as proposed action	Same as proposed action	Continued low level of impact to WSAs
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
UTILITIES AND SERVICES				
Water and Sewer				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Not significant	None required
Fire and Police				
Impacts	No significant impacts were identified for police protection; significant fire protection impacts were identified due to inadequate and poor hydrant placement and pressure	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required for police protection; obtain written agreement for fire protection services from the Riverside County Fire Department; submit a Fire/Life Safety and Emergency Response Plan to the Fire Department; install water mains and fire hydrants to provide the required fire flows; participate in the fire protection impact mitiga-	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
	tion program as adopted by the Riverside County Board of Supervisors			
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Utilities				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Community Facilities				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
NOISE				
Short-term Construction Noise				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
<u>Rail Operations</u>				
Impacts	Potential impacts to non-human receptors are not considered significant; potential noise impacts to future land uses	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Install sound attenuating walls as needed	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
<u>Truck Traffic</u>				
Impacts	Increases are not significant; only residences close to I-10 may experience CNELs above 65 dBA	Same as proposed action	There would be no noise impacts from truck traffic	No impact
Mitigation Measures	Require truck traffic to use the Eagle Mountain Road interchange and access to the project site	Same as proposed action	None required	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
<u>On-site Landfill Operations</u>				
Impacts	The potential exists for residences located within 500 feet of the project site to experience occasional significant noise levels during operations to remove cover material from the large tailing pile	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	Maintain the body of the tailing pile to serve as a noise barrier for as long as possible and specific restrictions on operations in this area	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
CULTURAL RESOURCES				
<u>Cultural Resources of Riv-3798 and Riv-3216</u>				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
Native American Concerns				
Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
PALEONTOLOGY				
Impacts	Excavations within portions of Eagle Mountain Mine improvements to Eagle Mountain Road at the I-10 exit have the potential to impact paleontologic resources; rehabilitation and maintenance of the rail line will not impact paleo resources	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	A program to mitigate impacts to paleontologic resources will include a preexcavation survey, excavation monitoring, fossil preparation and identification, and preparation of a report by a qualified paleontologist; this report shall be submitted to Riverside County, BLM, and	Same as proposed action	Same as proposed action	None required

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
	San Bernardino County Museum; rehabilitation and maintenance of the rail line will not require mitigation			
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
ENERGY				
Impacts	Project implementation will require approximately 17,000 more gallons of diesel fuel per day than landfills located closer to the wasteshed until LFG recovery/utilization occurs in 12 to 27 years	Will require approx. 11,289 more gallons of diesel fuel per day than landfills located closer to the wasteshed until LFG recovery/utilization in 12 to 27 years	Will require approximately 13,000 more gallons of diesel fuel per day than landfills located closer to the wasteshed until LFG recovery/utilization in 12 to 27 years	Southland currently uses 17,000 gallons of diesel fuel per day in landfills located closer to the wasteshed
Mitigation Measures	A preventative maintenance program would be implemented for the rail line and at the landfill site to maintain the operating efficiency of equipment and vehicles	Same as proposed action	Same as proposed action	None available
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Project
CUMULATIVE				
Water Quality/Use; Health and Safety; Traffic; Land Use; Growth and Socioeconomics; Visual, Recreation, and Wilderness; Utilities and Services; Noise; Cultural; Energy				
Cumulative Impacts	No significant impacts	Same as proposed action	Same as proposed action	No impact
Mitigation Measures	None required	Same as proposed action	Same as proposed action	None required
Significance after Mitigation	Not significant	Not significant	Not significant	Not significant
Air Quality				
Cumulative Impacts	Significant cumulative impacts	Incremental improvement over proposed action	Same as proposed action	Significant cumulative impacts
Mitigation Measures	Implementation of South Coast Air Quality Management Plan	Same as proposed action	Same as proposed action	Same as proposed action for other projects
Significance after Mitigation	Significant until year 2007	Same as proposed action	Same as proposed action	Same as proposed action

TABLE S-2
SUMMARY OF PROJECT AND ALTERNATIVES' IMPACTS, MITIGATION AND IMPLEMENTATION
(continued)

Issues	Proposed Action	Reduced Landfill Operations	Rail Access Only	No Action
Biological Resources				
Cumulative Impacts	Potential desert tortoise population fragmentation due to reactivation of Kaiser railroad; potential loss of substantial populations of Alverson's foxtail cactus and California barrel cactus due to project implementation	Same as proposed action	Same as proposed action	Potential of similar impacts in other project areas
Mitigation Measures	Preoperation surveys, monitoring raven control plan, rail and road barriers and culverts, employee education, off-site habitat preservation for desert tortoise; habitat preservation and salvage for public use of cactus species	Same as proposed action	Same as proposed action	Similar to proposed action
Significance after Mitigation	Not significant	Same as proposed action	Same as proposed action	Not significant

I. Introduction

A. Proposed Action

Mine Reclamation Corporation (MRC) proposes to develop a Class III nonhazardous solid waste landfill which would accommodate up to 20,000 tons of refuse per day. The landfill site would be located in an unused iron ore open pit mine (East Pit area) at Eagle Mountain in northeastern Riverside County, California, approximately 10 miles north of Interstate 10 (I-10) and the community of Desert Center (Figures 1 and 2). This region is bordered on the north by the Pinto Basin, on the east by the Chuckwalla Valley, on the south by the Chuckwalla Mountains, and on the west by the main body of the Eagle Mountains. The northern boundary of the project site is approximately 8,000 feet south of Joshua Tree National Monument. A ridgeline of the Eagle Mountains separates the project area from the Pinto Basin, which is within the monument and wilderness areas.

The East Pit area of the existing mine at Eagle Mountain is located on approximately 4,695 acres, some of which are under public ownership. The public lands, as well as some adjacent lands, will be transferred out of federal ownership to Kaiser Steel Resources, Inc., in exchange for lands owned by Kaiser. The project also includes the conversion of the right-of-way for the existing Eagle Mountain rail line granted to Kaiser Steel for mining uses between Ferrum Junction on the northeast coast of the Salton Sea and Eagle Mountain. This rail line is approximately 52 miles long, 32 miles of which exists on a legislatively authorized right-of-way, and would be used to transport waste-filled containers from the Southern Pacific line at Ferrum Junction to the project site. A new rail spur, approximately two miles long, would be built from the Eagle Mountain rail line to a container handling yard which would be located adjacent to the southeast portion of the landfill site.

Waste received by truck would access the site via a proposed extension of the existing Eagle Mountain Road and an existing on-site haul road. A new Federal Land Policy and Management Act (FLPMA) right-of-way would be issued over the entire length of the existing, legislatively authorized Eagle Mountain rail line, the existing Eagle Mountain Road, and the Eagle Mountain Road Extension which begins just south of the Metropolitan Water District (MWD) pumping station. Additionally, the Eagle Mountain Landfill Specific Plan would amend the Riverside County General Plan and the Zoning Ordinance and Map to facilitate initiation of a landfill operation at the Eagle Mountain Mine site. The above actions are described in detail with appropriate location maps in the proposed action in the Alternative section of this draft environmental impact statement/environmental impact report (EIS/EIR).

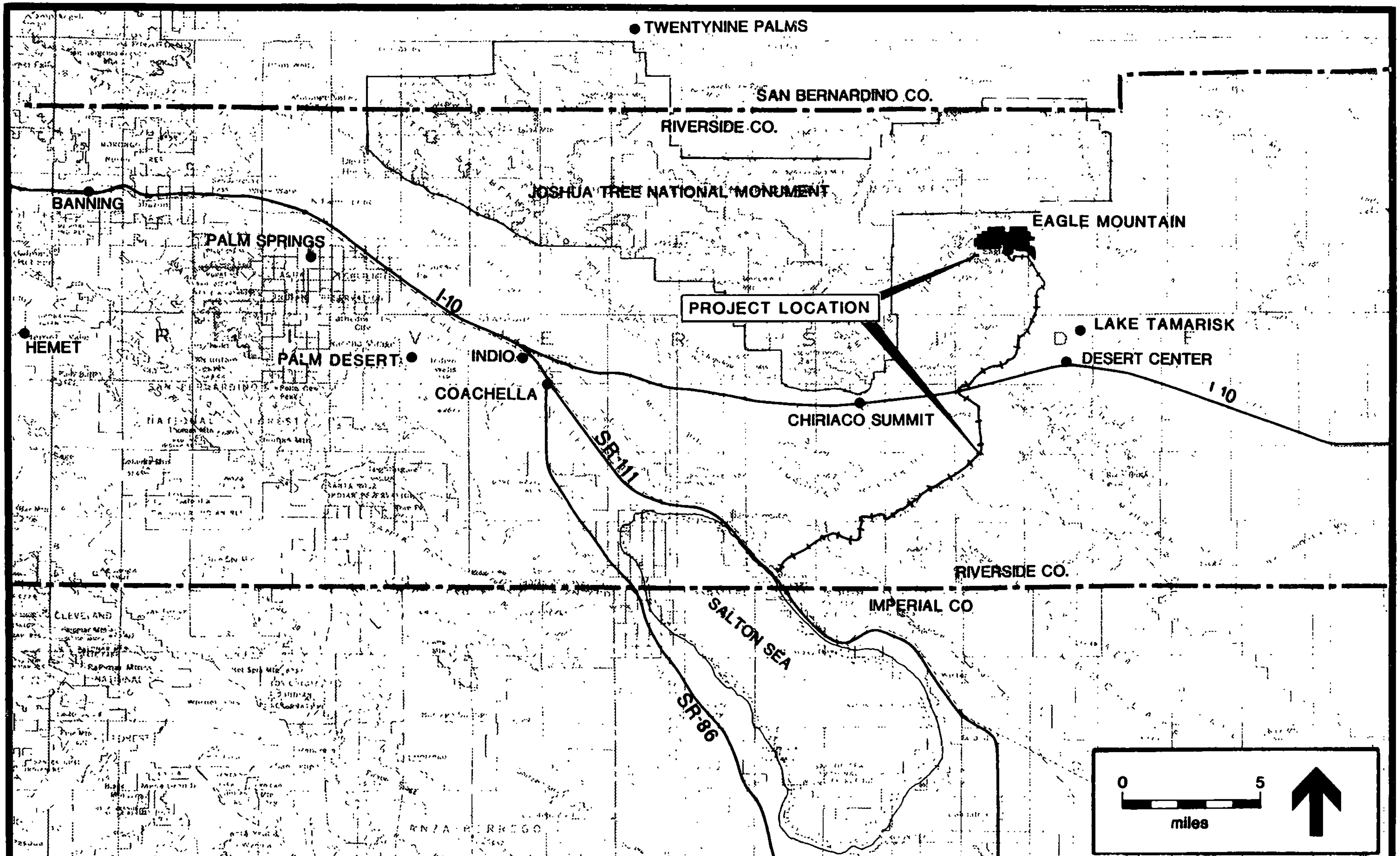


FIGURE 1. PROJECT LOCATION RELATIVE TO EASTERN RIVERSIDE COUNTY

RECON

R-2100E 2/91

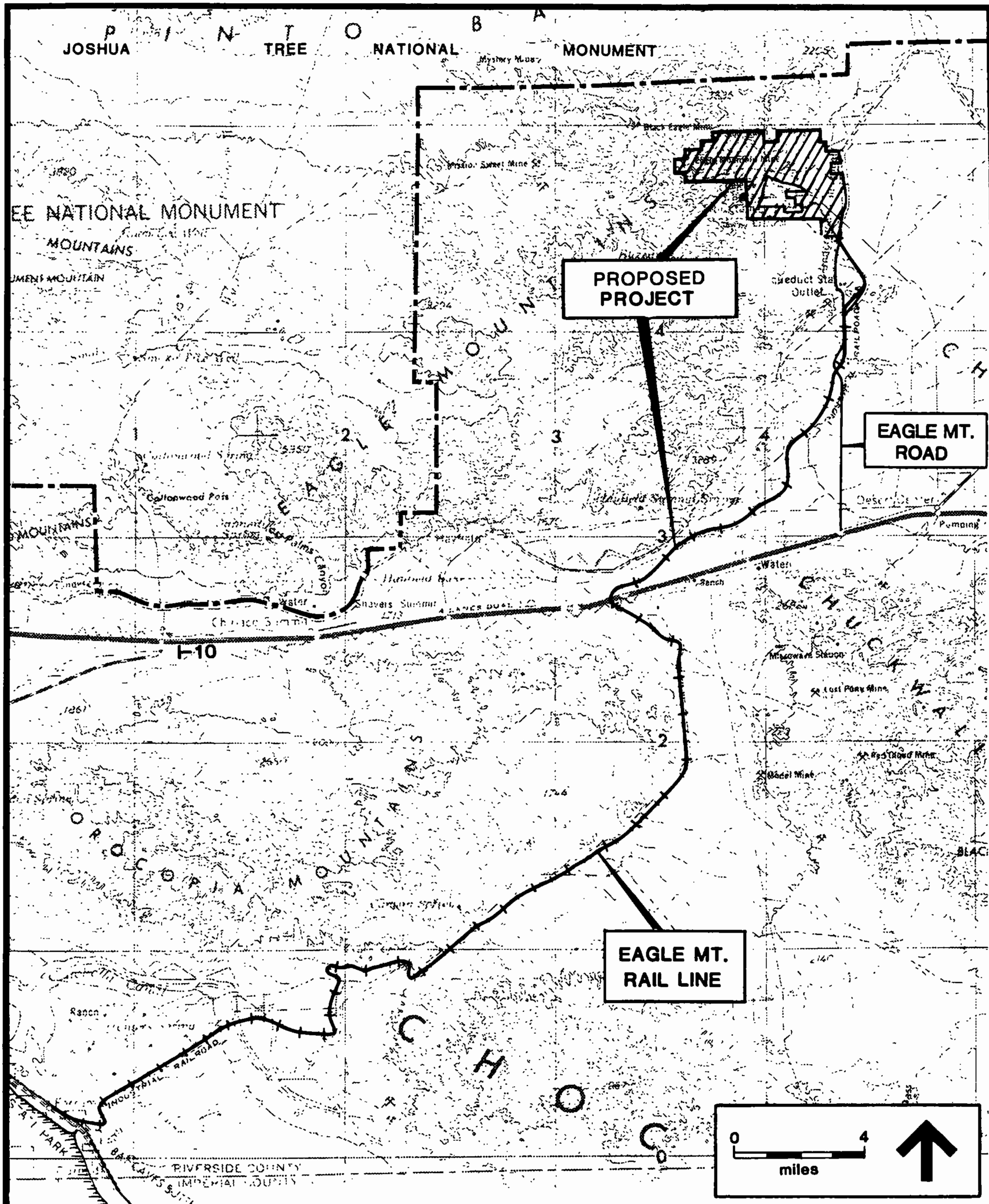


FIGURE 2. PROJECT LOCATION ON U.S.G.S. 1:250,000 SCALE MAP, SALTON SEA SHEET

RECON

R-2100E 2/91

B. Purpose and Need for the Project

The purpose and need for this project are (1) to develop new Class III waste disposal facilities needed to accommodate estimated future demand throughout southern California and (2) to provide capacity in a remote desert setting which avoids land use compatibility and landfill gas emission problems faced by existing landfills in proximity to residential and other urban uses.

In terms of supply and demand, a number of publications have documented the need for new refuse disposal facilities in Los Angeles, San Bernardino, Riverside, and Orange counties. This information is summarized as follows.

Currently, a total of approximately 45,000 tons per day (tpd) of nonhazardous solid waste is generated within Los Angeles County. Of this total, approximately 18,000 tpd comes from the city of Los Angeles and 8,000 tpd from the San Gabriel Valley. If no new landfills are developed, existing facilities are not expanded, and recycling remains at approximately existing levels, a county-wide disposal capacity shortfall will first occur in 1991, increasing to approximately 40,000 tpd in 1995 (City of Los Angeles, County of Los Angeles, and Los Angeles County Sanitation Districts 1988). The city of Los Angeles is already experiencing a disposal shortfall of 5,000 tpd, which is expected to increase to 20,000 tpd in 1997 (City of Los Angeles, County of Los Angeles, and Los Angeles County Sanitation Districts 1988).

State Assembly Bill (AB) 939, a recently enacted statute requiring mandatory recycling for residential solid waste, is expected to reduce the severity of the disposal capacity shortfall in Los Angeles County as this program is implemented over the next few years. Historically, successful curbside residential recycling programs have resulted in the diversion of 12-15 percent of the residential waste stream from landfills. If these results are achieved in the city of Los Angeles, for example, curbside collection may result in the diversion of 900 tpd. This savings would reduce the total waste landfilled in the city by 5 percent. Additional savings will be achieved as the City implements planned yard waste composting and other diversion programs.

As of 1987, the valley area of San Bernardino County (with 80 percent of the county's total population) was generating and disposing of approximately 3,900 tpd of nonhazardous solid waste in five County-owned landfills. If per capita waste generation increases at the same rate as elsewhere in southern California, existing capacity may be exhausted in approximately six years. The County is evaluating the potential to expand an existing landfill and to site new facilities to meet its long-term disposal needs (Southern California Association of Governments [SCAG] 1988:1-16).

The Riverside County Solid Waste Management Plan (CoSWMP) estimates total solid waste generation in the county in 1990 at 1,560,000 tons per year. On a six-day-per-week basis, this means that slightly more than 5,000 tpd are landfilled in the county. The CoSWMP projects that waste generation will almost double between 1987 and the year 2005. This projection is based almost entirely on projected growth and a constant rate of per capita waste generation. Although projects other than Eagle Mountain could conceivably meet future demand within Riverside County, the Board of Supervisors has reserved up to 2,000 tpd in its existing agreement with the project applicant. The El Sobrante, Lamb Canyon, and Eagle Mountain landfill sites are tentatively identified as future regional disposal sites in the CoSWMP (1989a:XI-40).

Of all the southern California counties, Orange County has the most permitted disposal capacity relative to anticipated demand. At the current waste disposal rates of approximately 12,900 to 16,100 tpd, the permitted capacity of existing landfills will last for approximately 11 years. The recent approval of a new major landfill at Bee Canyon will increase the site life of existing facilities to approximately 18 years. The County is currently attempting to site a new facility in the northern portion of the county to replace the existing Olinda Landfill. Without this new facility, however, a capacity shortage within northern Orange County may occur in 1994 when the remaining capacity at the Olinda Landfill is fully utilized.

C. Decisions Needed

1. Federal

The State Director of the Bureau of Land Management (BLM) must approve a real estate action involving the transfer of BLM lands to Kaiser Steel Resources, Inc., in the Eagle Mountains in return for Kaiser lands along the Eagle Mountain rail line. Also, the director must approve a new FLPMA right-of-way over the entire length of the Eagle Mountain rail line, Eagle Mountain Road, and the proposed Eagle Mountain Road Extension. These actions are described in detail with appropriate location maps in the proposed action in the Alternatives section of this draft EIS/EIR.

2. County

The Riverside County Board of Supervisors must approve a General Plan Amendment, zone change application, and provision of a Specific Plan to establish a Class III nonhazardous solid waste landfill in the Eagle Mountains. The Mine Reclamation Plan approved in 1978 must be revised and a Development Agreement approved. The Specific Plan that includes the landfill site is described in detail in the proposed action in the Alternatives section of this draft EIS/EIR.

D. Consultation and Coordination

1. Scoping

The process to identify the scope and contents of this draft EIS/EIR was formally initiated on August 15, 1989, by the publication of the Notice of Preparation (NOP) required by the California Environmental Quality Act (CEQA) for the EIR to be prepared by the County of Riverside. The NOP was sent to 175 agencies, cities, governmental officials, and other groups. Copies were also sent to the California Office of Planning and Research (OPR), the state clearinghouse for distribution to state agencies. OPR sent the NOP to 10 different state regulatory or resource agencies. Appendix A contains the NOP and list of recipients.

The County of Riverside conducted public scoping meetings at the following locations:

Desert Center – August 30, 1989
Indio – August 31, 1989
Riverside – September 1, 1989
Blythe – September 14, 1989

At the federal level, the Notice of Intent to prepare the draft EIS was published in the *Federal Register* on November 15, 1989 (copy included in Appendix A). Additional public scoping meetings were held by the BLM and the County:

Desert Center – December 6, 1989
Palm Desert – December 7, 1989
Los Angeles – December 11, 1989 (with SCAG)

Table 1 contains a summary of the responses obtained through this scoping process, presented as a list of issues along with the number of times each issue was raised. The classification of comments into specific issues involved some judgment and, therefore, does not reflect perfectly each and every comment. The list is useful in identifying the general level of concern for various issues. The overwhelming number of comments were requests for information regarding details of the project description and/or alternatives to the project. With respect to specific environmental issues, the most frequently expressed concerns dealt with water quality, public safety, traffic, and air quality.

Copies of the letters received and notes from the scoping meetings are also included in Appendix A.

The issue of most concern to respondents was the protection of groundwater quality in the Chuckwalla Valley. Measures to protect groundwater have been incorporated into the project

TABLE 1
RESULTS FROM SCOPING MEETINGS AND LETTERS

Issues	Number of Comments
Water Quality	55
Effects on aquifer	
Integrity of lining	
Handling of leachate	
Public Health/Safety	46
Sorting of hazardous wastes	
Effects of accidents	
Employee safety	
Traffic/Transportation	29
Inventory of traffic generation	
Effect of trains on local traffic	
Effect of trains on other rail traffic	
Road maintenance	
Air Quality	28
Landfill emissions	
Truck emissions	
APCD review	
Odors	
Land Use	12
Conformance with Desert Plan	
Conformance with Pass Community Plan	
Conformance with pending desert protection act	
Effects on local agriculture	
Effects on aqueduct	
Drainage	11
Accommodation of surface runoff	
Drainage on access road	
Biology	10
Effects on desert tortoise and bighorn sheep	
Socioeconomics	9
Effect on local economy	
Number of employees	
Union	

TABLE 1
RESULTS FROM SCOPING MEETINGS AND LETTERS
(continued)

Issues	Number of Comments

Geology
  Effect from faults
  Stability
  Effects on recoverable mineral resources
	5

Recreation/Visual Resources
  Effect on views from wilderness
  Effect from airborne trash
  Effect from night lighting
	6

Utilities/Services Effect on schools	3
Noise From landfill operations, trains, and trucks	3
Cultural Resources	1
Paleontology	1

design, and a thorough regulatory and enforcement program is administered by the California State Water Resources Control Board (SWRCB) and its local Regional Water Quality Control Board (RWQCB) and by the California Integrated Waste Management Board (CIWMB) and the local County Department of Health acting as the Local Enforcement Agency (LEA) for the state. These measures and the existing enforcement apparatus would avoid the potential for significant groundwater pollution.

Other strongly voiced concerns relate to the acceptability of transporting solid waste from outside the County of Riverside for disposal inside the county. This issue is a policy question which must be decided by County officials.

2. List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

State public review of the draft EIS/EIR was initiated on July 9, 1991, by the filing of the Notice of Completion by the County of Riverside with the State Office of Planning and Research, as required by CEQA. Federal public review of the draft EIS/EIR was initiated on July 19, 1991, by the publication of the Notice of Availability in the *Federal Register* by the BLM. The state public review period ends on September 7, 1991, and the federal public review period ends on September 17, 1991.

Ten copies of the draft EIS/EIR were mailed to OPR for distribution to state agencies. Twenty-two copies were also sent to various federal agencies.

Copies of the draft EIS/EIR were placed in the following libraries:

BLM Library
SC-324 A, Building 50
Denver Federal Center
Denver, CO 80225

California State Library
Governmental Publications
Sacramento, CA 94237

Coachella Branch Library
1538 Seventh Street
Coachella, CA 92236

Desert Hot Springs Branch Library
11691 West Drive
Desert Hot Springs, CA 92240

Indio Branch Library
200 Civic Center Hall
Indio, CA 92201

Lake Tamarisk Branch Library
43880 Lake Tamarisk Drive
Desert Center, CA 92239

Los Angeles Public Library
Dept. of Science, Tech, and Patents
630 West Fifth Street
Los Angeles, CA 90071

Los Angeles Public Library
Documents Department
433 Spring Street
Los Angeles, CA 90013

Palm Desert Branch Library
45480 Portola
Palm Desert, CA 92260

Palm Springs Library Center
300 South Sunrise Way
Palm Springs, CA 92262

Palo Verde Valley District Library
125 West Chanslor Way
Blythe, CA 92225

Riverside County/City Public Library
Central Library
Government Publications
3581 Seventh Street
Riverside, CA 92501

San Bernardino County Library
Joshua Tree Branch
6465 Park Boulevard
Joshua Tree, CA 92252

San Bernardino County Library
Twentynine Palms Branch
6078 Adobe Road
Yucca Valley, CA 92277

San Bernardino County Library
Yucca Valley Branch
57098 Twentynine Palms Highway
Yucca Valley, CA 92284

San Bernardino Public Library
Feldheym Central Library
555 West Sixth Street
San Bernardino, CA 92410

UC Riverside Library
Government Publications
201 East La Habra Boulevard
La Habra, CA 90631-0337

and are available for inspection at the following offices:

County of Riverside Planning Department
4080 Lemon Avenue, 9th Floor
Riverside, CA 92501

Bureau of Land Management
California Desert District
6221 Box Springs Road
Riverside, CA 92507

County of Riverside Planning Department
79733 Country Club Drive, Suite E
Bermuda Dunes, CA 92201

Bureau of Land Management
California State Office
Federal Office Building
2800 Cottage Way, Room E-2841
Sacramento, CA 95825

Address prior to 8/1/91
Bureau of Land Management
Palm Springs–South Coast Resource Area
400 South Farrell Street, B-205
Palm Springs, CA 92262

Address as of 8/1/91
Bureau of Land Management
Palm Springs–South Coast Resource Area
63-500 Garnet Avenue
North Palm Springs, CA 92258-2000

In addition, copies were mailed to other agencies, local governments, and interested groups and individuals. Appendix A contains a complete distribution list of the draft EIS/EIR.

E. Federal, State, and Local Permits and Approvals

1. Federal

a. Bureau of Land Management

1) Prepare and publish in the *Federal Register* a Notice of a Realty Action (NORA) concerning the land exchange.

2) Prepare and publish in the *Federal Register* a Record of Decision (ROD) concerning the land exchange and road/railroad right-of-way grant.

3) BLM has entered into a master Memorandum of Understanding (MOU) with the California Department of Fish and Game (CDFG) to consult with CDFG whenever species of concern or sensitive habitat may be affected by a BLM action.

b. U.S. Fish and Wildlife Service

The railroad right-of-way and land exchange approval would require a consultation with the U.S. Fish and Wildlife Service (pursuant to Section 7 of the Endangered Species Act) because the resumption of the intensive use of the railroad and exchange of public lands out of federal ownership could affect federally listed threatened or endangered species.

c. U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers may require a permit pursuant to Section 404 of the federal Clean Water Act for any filling or watercourse diversion activities which would affect jurisdictional waters or wetlands. Construction of drainage improvements within the project site or along the railroad right-of-way may affect drainage or wetlands, requiring this permit.

d. State Historic Preservation Officer

There were no impacts to cultural resources; therefore, no Section 106 consultation is required by the National Historic Preservation Act.

2. State

a. California Integrated Waste Management Board

Issuance of the solid waste facilities permit will be required by the CIWMB.

b. California Department of Fish and Game

An agreement (pursuant to Section 1603 of the California Fish and Game Code) will be required with the California Department of Fish and Game for the alteration of any streambed. In addition, an MOU (pursuant to Section 2081 of the California Fish and Game Code) may be required concerning state-listed endangered or threatened species.

3. Local

a. County of Riverside

The Riverside County General Plan would be amended to establish a Specific Plan Area, and a Specific Plan would be adopted over the project area to establish land use regulations for the landfill and associated activities. A zone change application must be approved also. The approved Kaiser Mine Reclamation Plan will be revised and a Development Agreement approved. The County Department of Health is the LEA acting for the CIWMB. It will issue the solid waste facilities permit.

b. Lower Colorado River Regional Water Quality Control Board

Waste discharge requirements will be established by this agency for the project. Baseline groundwater monitoring is being conducted in accordance with the requirements of the Lower Colorado River RWQCB, and the waste discharge requirements will include an expanded monitoring program, approval of an acceptable liner configuration, and closure and post-closure activities.

c. South Coast Air Quality Management District

An Authority to Construct and a Permit to Operate will be necessary for the landfill gas collection and condensate disposal system. Operation of the thermal combustor must comply with Rule 1150.1, and fugitive dust will be controlled according to district rules.

II. Alternatives Including the Proposed Action

A. Proposed Action

1. Introduction

Mine Reclamation Corporation proposes to develop a Class III nonhazardous solid waste landfill which would accommodate up to 20,000 tons per day. The landfill site would be located in an unused iron ore open pit mine at Eagle Mountain in northeastern Riverside County, California. The project site at Eagle Mountain is located on approximately 4,695 acres, of which 2,280 acres are under BLM ownership. These lands will be transferred out of federal ownership to Kaiser Steel Resources, Inc., in exchange for lands owned by Kaiser Steel Resources, Inc., along the existing Eagle Mountain rail line. The project includes the conversion of the rail line right-of-way granted to Kaiser Steel Resources, Inc., for mining uses between Ferrum Junction on the northeast coast of the Salton Sea and Eagle Mountain. This rail line is approximately 52 miles long, 32 miles of which exist on a legislatively authorized right-of-way, and would be used to transport waste-filled containers from the Southern Pacific line at Ferrum Junction to the project site. A new rail spur, approximately two miles long, would be built from the Eagle Mountain rail line to a container handling yard located adjacent to the southeast portion of the project site.

Waste received by truck would access the site via a proposed extension of the existing Eagle Mountain Road and an existing on-site haul road. A new FLPMA right-of-way would be issued over the entire length of the existing, legislatively authorized Eagle Mountain rail line right-of-way, the existing Eagle Mountain Road, and the proposed Eagle Mountain Road Extension which begins just south of the Metropolitan Water District pumping station. The existing Kaiser Truck Trail legislatively authorized right-of-way would be abandoned. Additionally, the Eagle Mountain Landfill Specific Plan would amend the Riverside County General Plan and the Zoning Ordinance and Map to facilitate initiation of a landfill operation at the Eagle Mountain iron ore mine site.

Several off-site solid waste processing and transfer stations will be necessary to serve the landfill; however, they are not part of the proposed action and are not discussed in detail in this draft EIS/EIR.

2. BLM/Kaiser Steel Resources, Inc., Land Exchange

Federal lands currently within the project area are shown in the California Desert Conservation Area (CDCA) Plan (Figure 3), as being in the following Multiple-Use Classes: Class I - Intensive, Class M - Moderate, and Unclassified. In the original CDCA Plan, nonhazardous

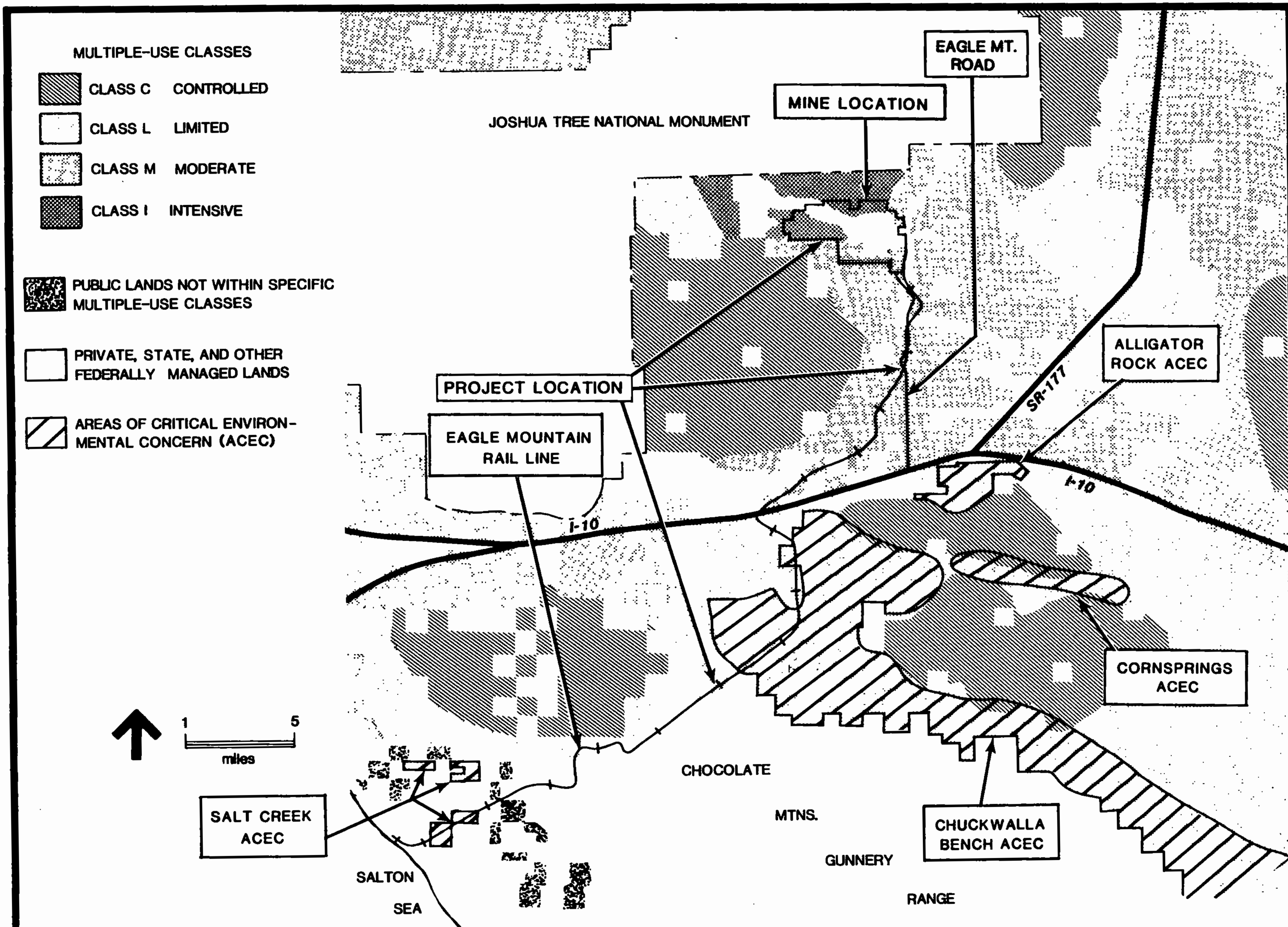


FIGURE 3. CALIFORNIA DESERT CONSERVATION AREA PLAN

waste disposal sites were allowed in Classes I and M, but a subsequent amendment (1985/#4) prohibits use of public lands for disposal of either hazardous or nonhazardous waste (BLM 1989). Kaiser Steel Resources, Inc., has selected those public lands it wants to be transferred to private ownership. Land currently owned by Kaiser Steel Resources, Inc., will be offered in exchange for those selected lands. The land exchange will be made pursuant to FLPMA, Title II, Section 206. A Mineral Potential Evaluation will be completed, and a current fair market appraisal will be made on both the selected and offered lands. The acreages will be balanced according to these values.

a. Selected Lands

Under FLPMA, BLM will transfer approximately 3,271 acres of publicly owned lands in the Eagle Mountains to Kaiser Steel Resources, Inc. These lands fall within Secs. 25-28 and 33-36, T. 3 S., R. 14 E.; Secs. 30 and 31, T. 3 S., R. 15 E.; Secs. 1, 2, 11, and 12, T. 4 S., R. 14 E.; and Secs. 6 and 7, T. 4 S., R. 15 E., San Bernardino meridian (SBM) (Figure 4). These selected lands include both unencumbered parcels and lands currently encumbered with a variety of unpatented mining and millsite claims. The land exchange process will include a review and appraisal of these claims.

b. Offered Lands

Offered lands are those Kaiser Steel Resources lands to be transferred to federal ownership. These are generally located at certain sites along the Eagle Mountain rail line from Ferrum Junction (on the northeast coast of the Salton Sea) to just north of I-10 (Figures 5-10). Through the land exchange, BLM will acquire lands of prime habitat for the federal- and state-listed threatened desert tortoise. In addition, lands and habitat for other federally endangered, threatened, and sensitive animal and plant species would be transferred to BLM ownership to establish a 20,000-acre nature preserve which includes the Salt Creek Area of Critical Environmental Concern. Acquisition of these offered lands will contribute towards this goal and will result in a more efficient and effective way to manage the preserve area.

c. Reverter Clause

The Eagle Mountain townsite is owned by Kaiser Steel Resources, Inc., but the deed granting ownership includes a clause that title will revert to the BLM in the event the townsite is not used in support of mining. Part of the land exchange process will include a valuation of the reverter clause. This value will be added to the fair market value of the selected lands.

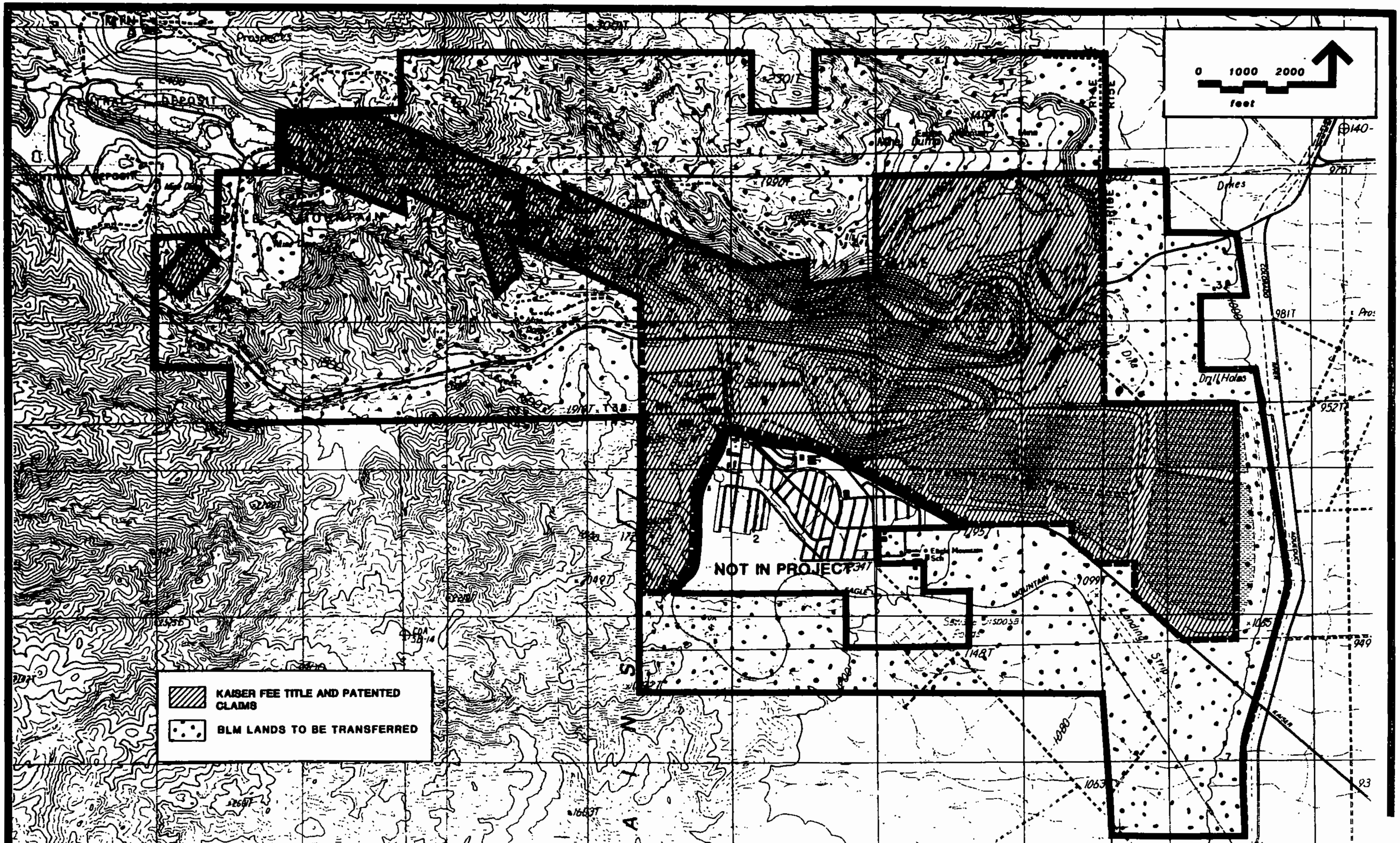


FIGURE 4. BLM LANDS TO BE TRANSFERRED TO KAISER STEEL RESOURCES OWNERSHIP

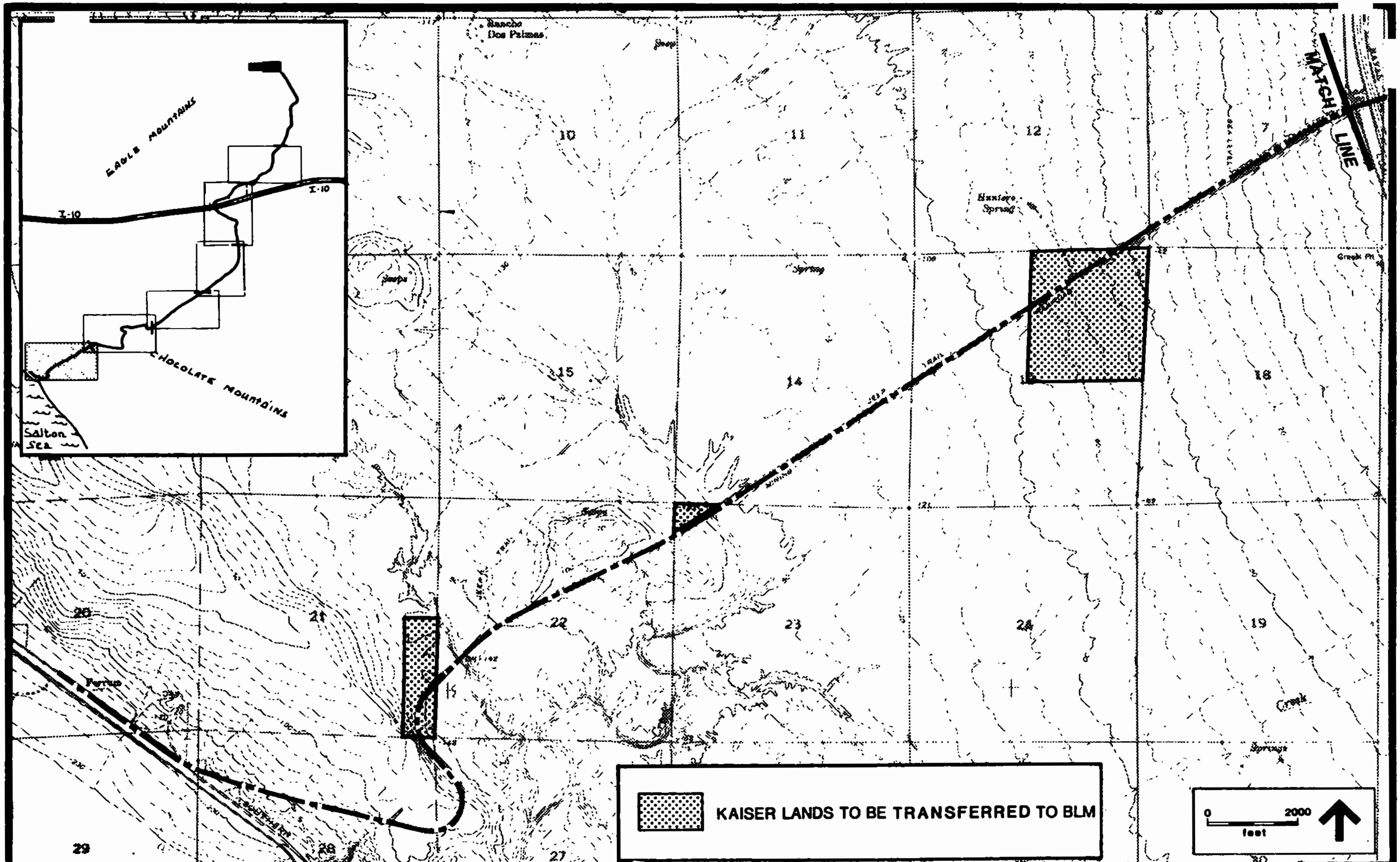


FIGURE 5. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 1 OF 6

RECON

R-2100 7/90

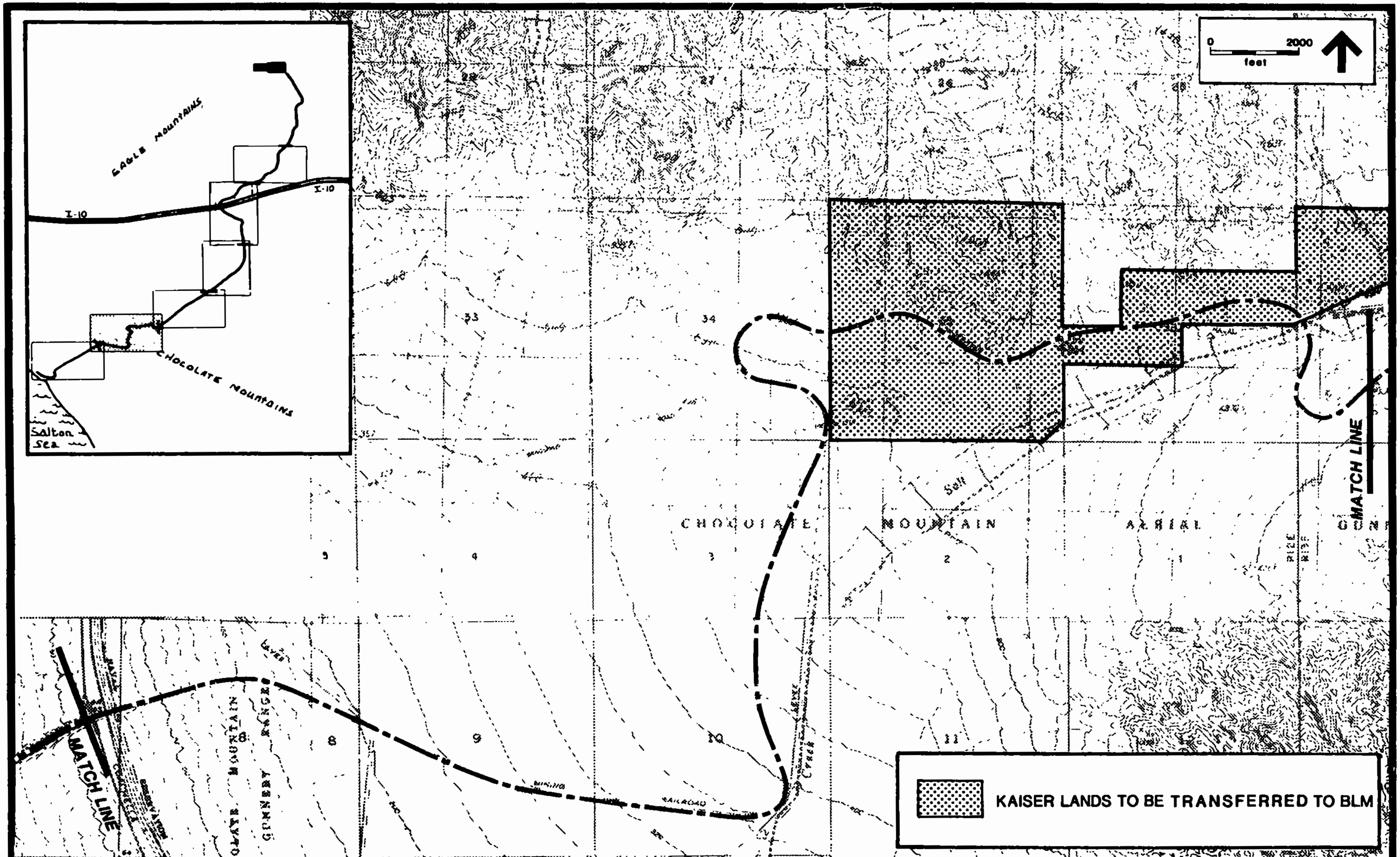


FIGURE 6. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 2 OF 6

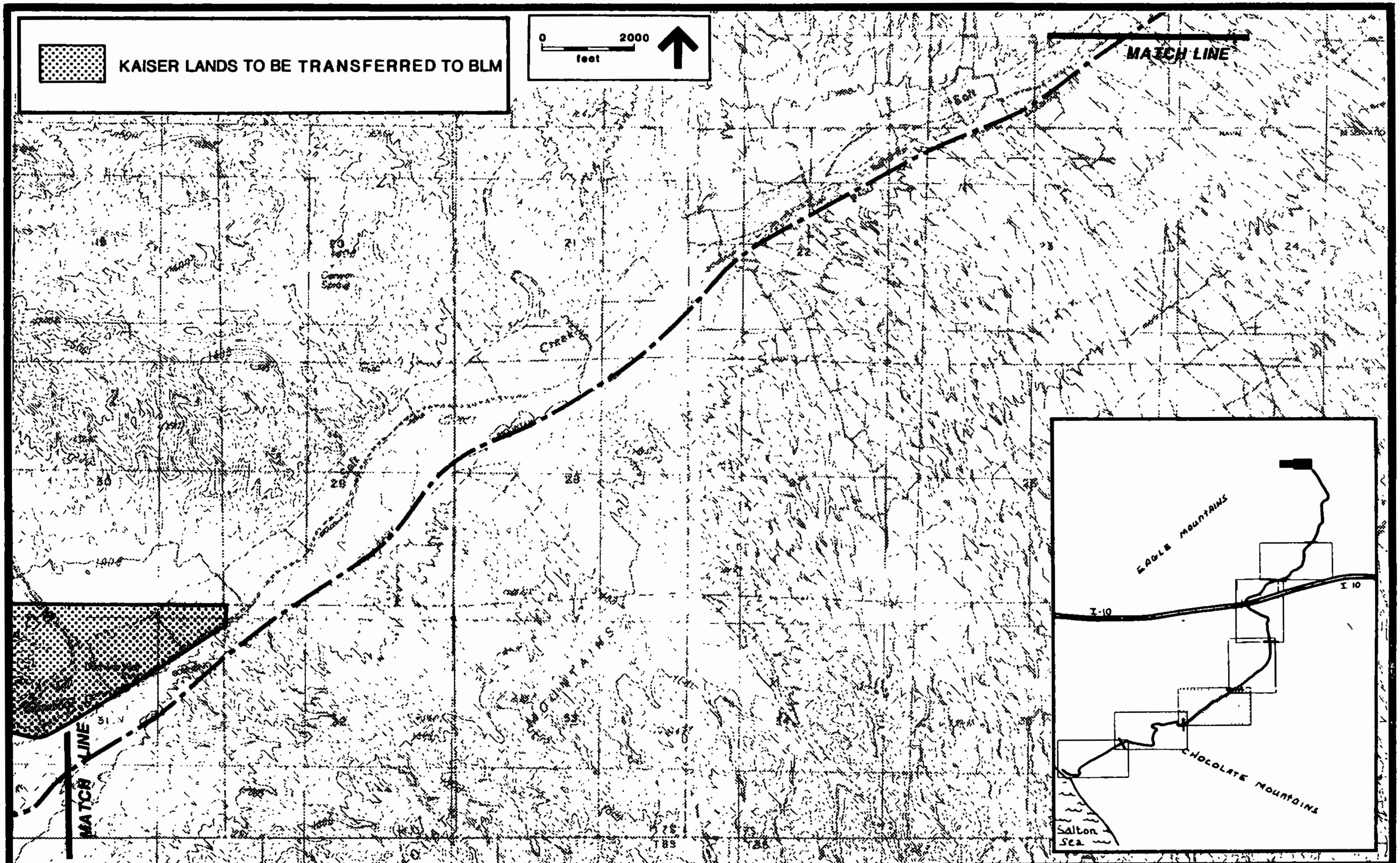


FIGURE 7. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 3 OF 6

RECON

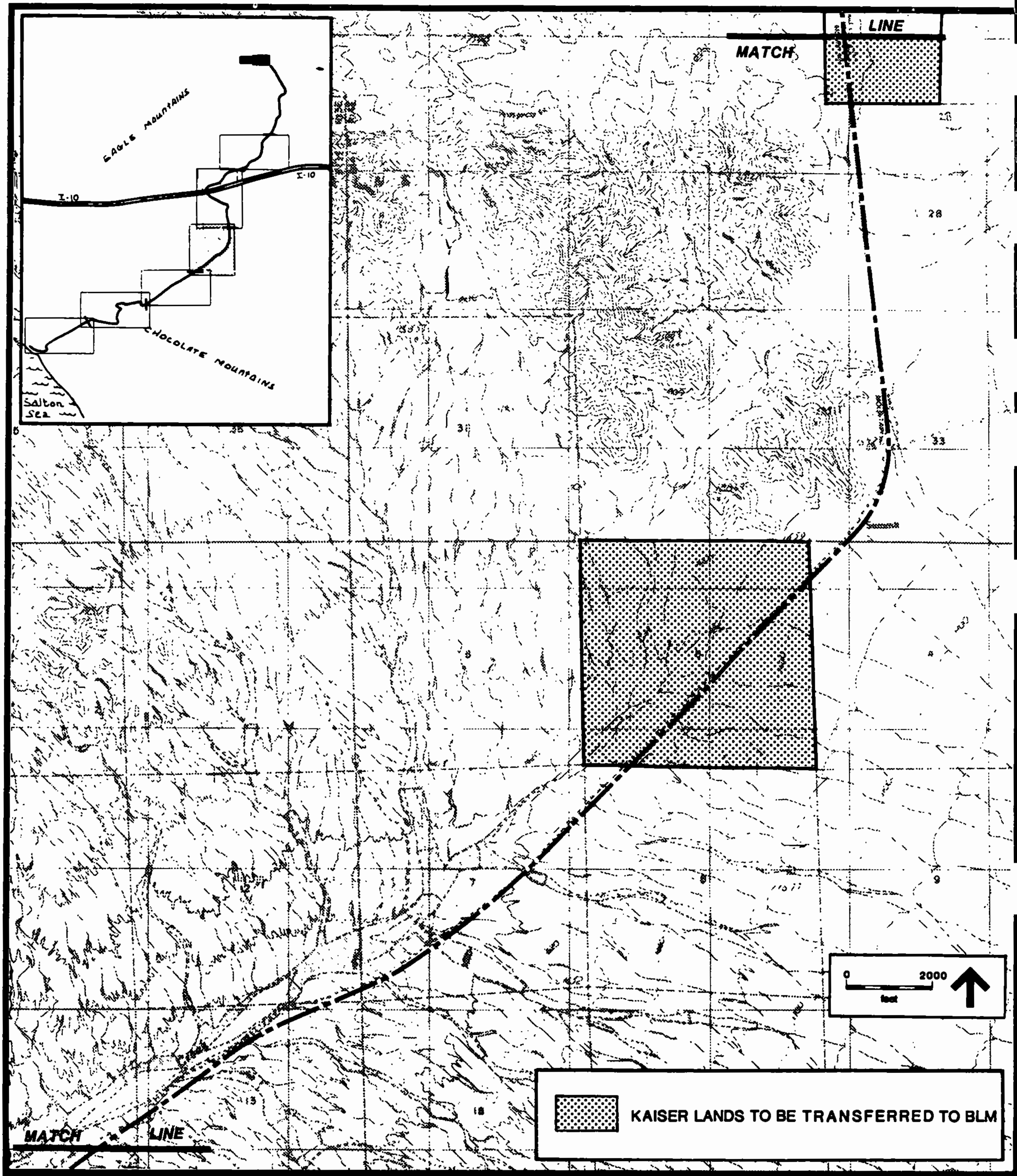


FIGURE 8. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 4 OF 6

RECON

R-2100E 7/90

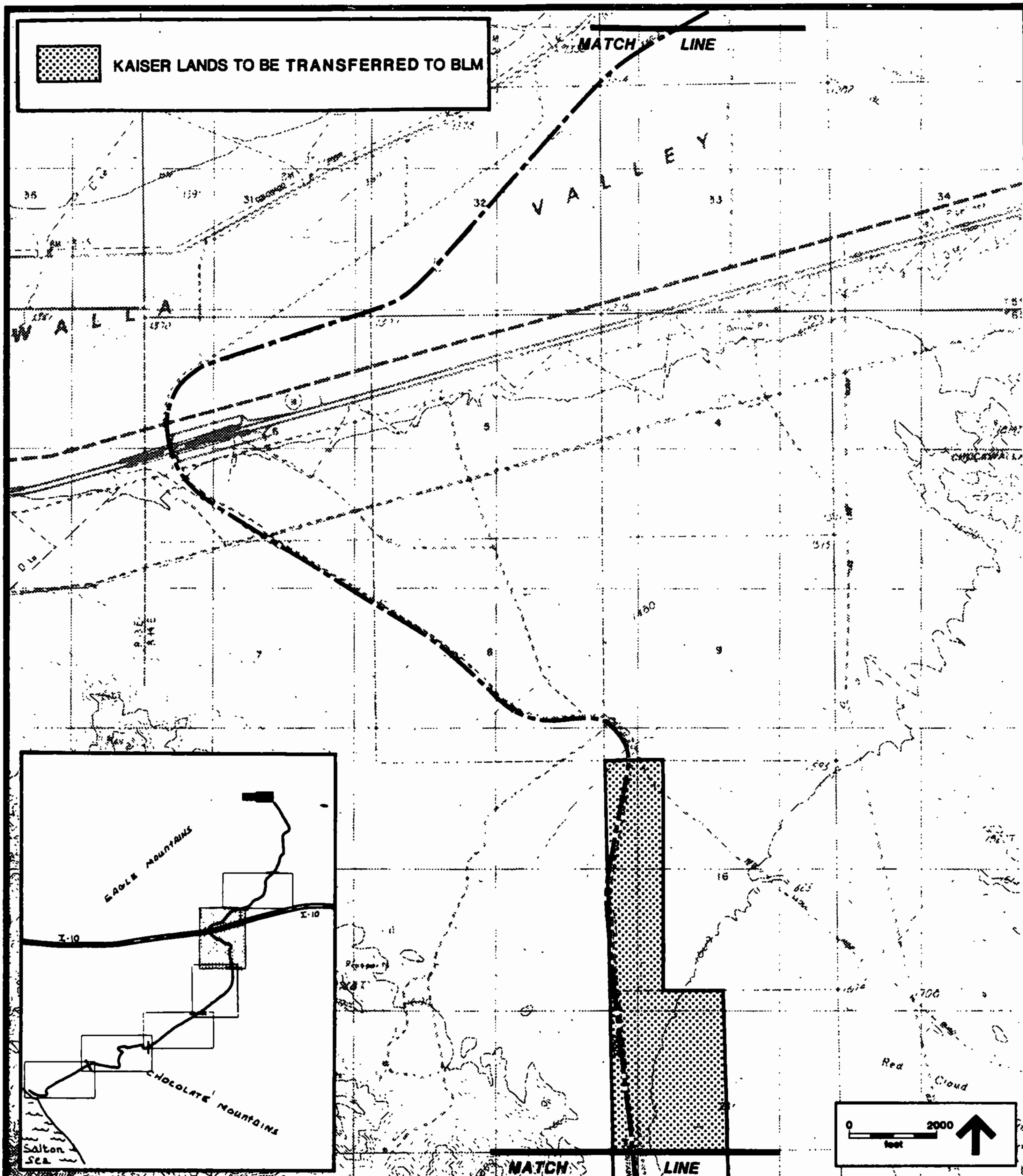


FIGURE 9. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 5 OF 6

RECON

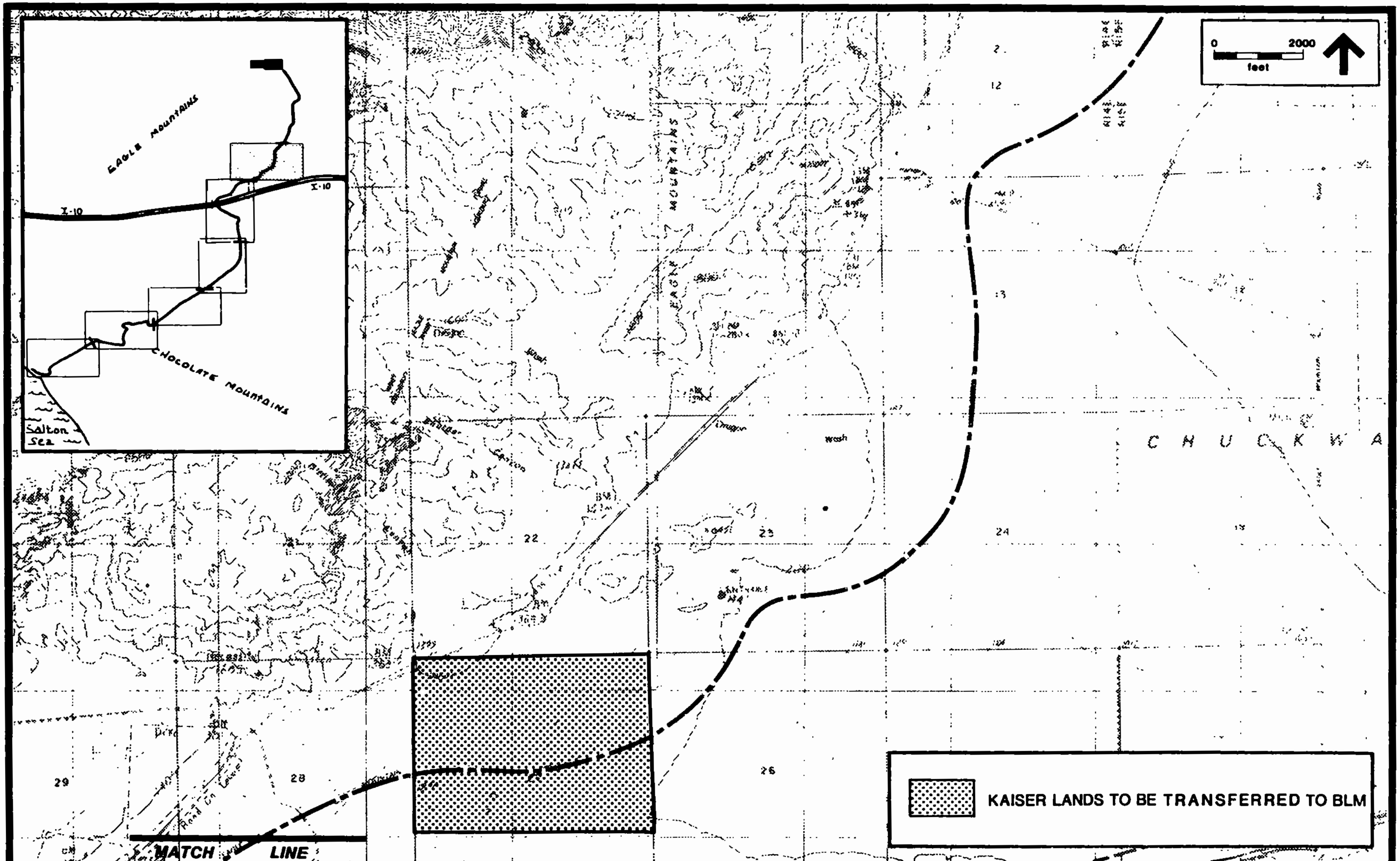


FIGURE 10. KAISER STEEL RESOURCES LANDS TO BE TRANSFERRED TO BUREAU OF LAND MANAGEMENT OWNERSHIP, MAP 6 OF 6

RECON

3. FLPMA Roads and Railroad Right-of-Way Grants

a. Eagle Mountain Road

Figure 11 shows the existing Eagle Mountain Road from the I-10 interchange to the MWD pumping station. The road begins in SE1/4 Sec. 30, T. 5 S., R. 15 E., SBM, and runs almost due north ending in NE1/4 Sec. 30, T. 4 S., R. 15 E., SBM. The paved road is currently maintained by the County of Riverside, authorized under federal Revised Statutes Section 2477. The proposed action is to widen the existing two-lane, 20-foot-wide paved road to a two-lane, 40-foot-wide paved road. The total right-of-way being applied for is 110 feet wide to allow for the paved roadway, shoulders, and berms. This portion of the right-of-way is approximately seven miles long. The purpose of this road right-of-way is to serve as the main access route to the proposed landfill site.

b. Eagle Mountain Road Extension

Figure 12 shows the proposed Eagle Mountain Road Extension. The road will begin in NE1/4 Sec. 30, T. 4 S., R. 15 E., SBM, just south of the MWD pumping station and will continue northeasterly at first and then northwesterly before heading northerly to an existing landfill on-site haul road. Approximately one and one- half miles of this proposed route are currently authorized under right-of-way grant LA-0121701 for mining-related purposes only. This partially existing dirt road is approximately 15 to 18 feet wide in most areas and is known locally as the Kaiser Truck Trail. This portion of the truck trail will be converted to a FLPMA right-of-way. The remainder of the Kaiser Truck Trail, currently authorized under right-of-way grant LA-0121701, will be vacated.

The proposed action is to widen the existing portion and build a new 40-foot-wide paved road. The total right-of-way being applied for is 110 feet wide to allow for the paved roadway, shoulders, and berms. This proposed portion of the right-of-way is approximately six miles long. The purpose of this road extension is to lead the truck traffic hauling refuse to the proposed landfill around the townsite of Eagle Mountain into the proposed Phase I container handling yard (see Figure 12) and at a later date into the Phase II container handling yard (Figure 13).

c. Rail Line

Figure 2 in the Introduction of this draft EIS/EIR shows the existing 52-mile private rail line beginning at its intersection with the Southern Pacific line at Ferrum Junction running northerly to a mine site at Eagle Mountain. Approximately 33 miles of the rail line falls on BLM lands. The rail line is authorized under right-of-way grant LA-0121701 for mining-related activities only. This right-of-way will be converted to a FLPMA right-of-way. The purpose of this right-of-way is to allow train transport of refuse containers from the Southern Pacific line at

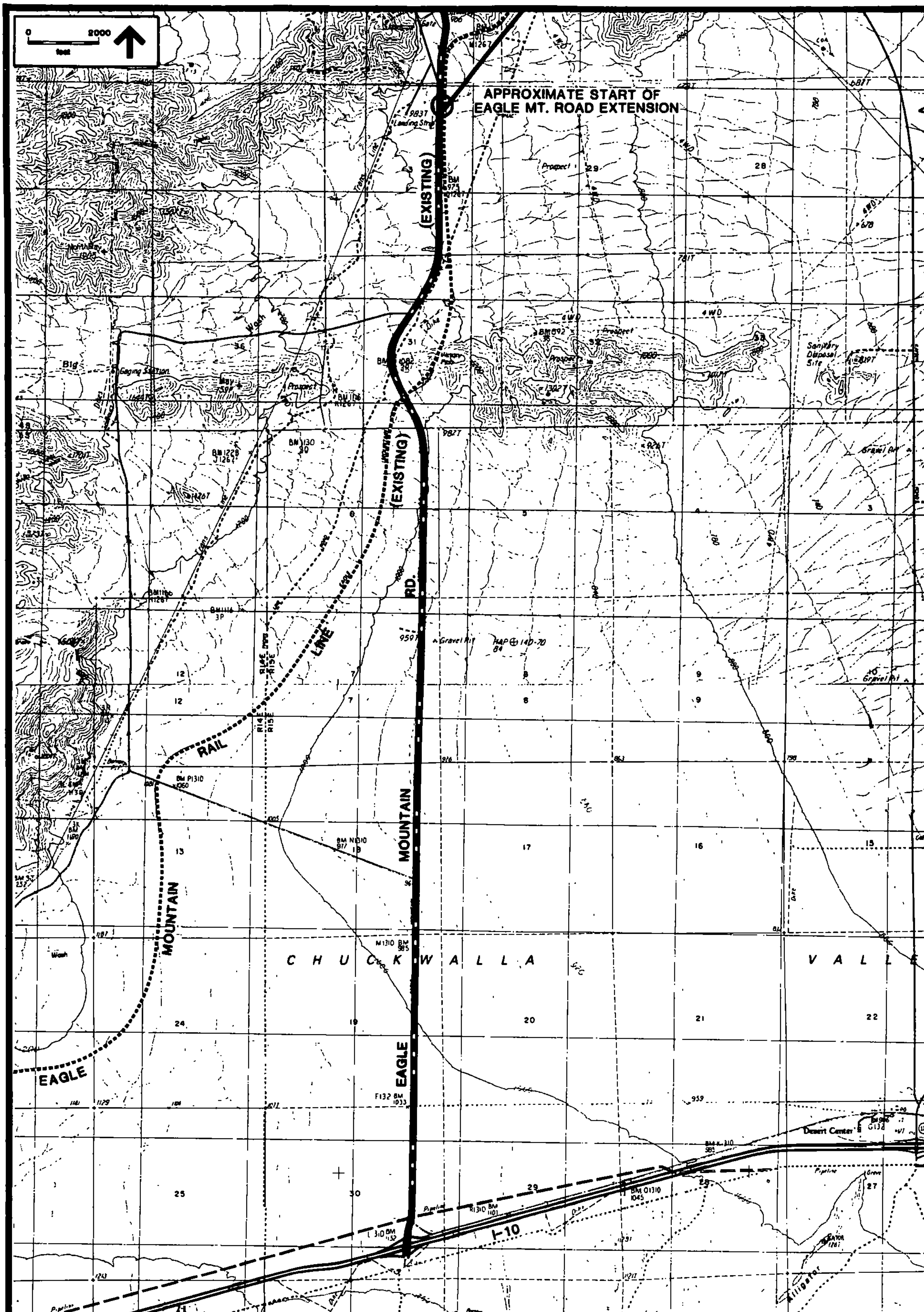


FIGURE 11. EXISTING EAGLE MOUNTAIN ROAD ALIGNMENT

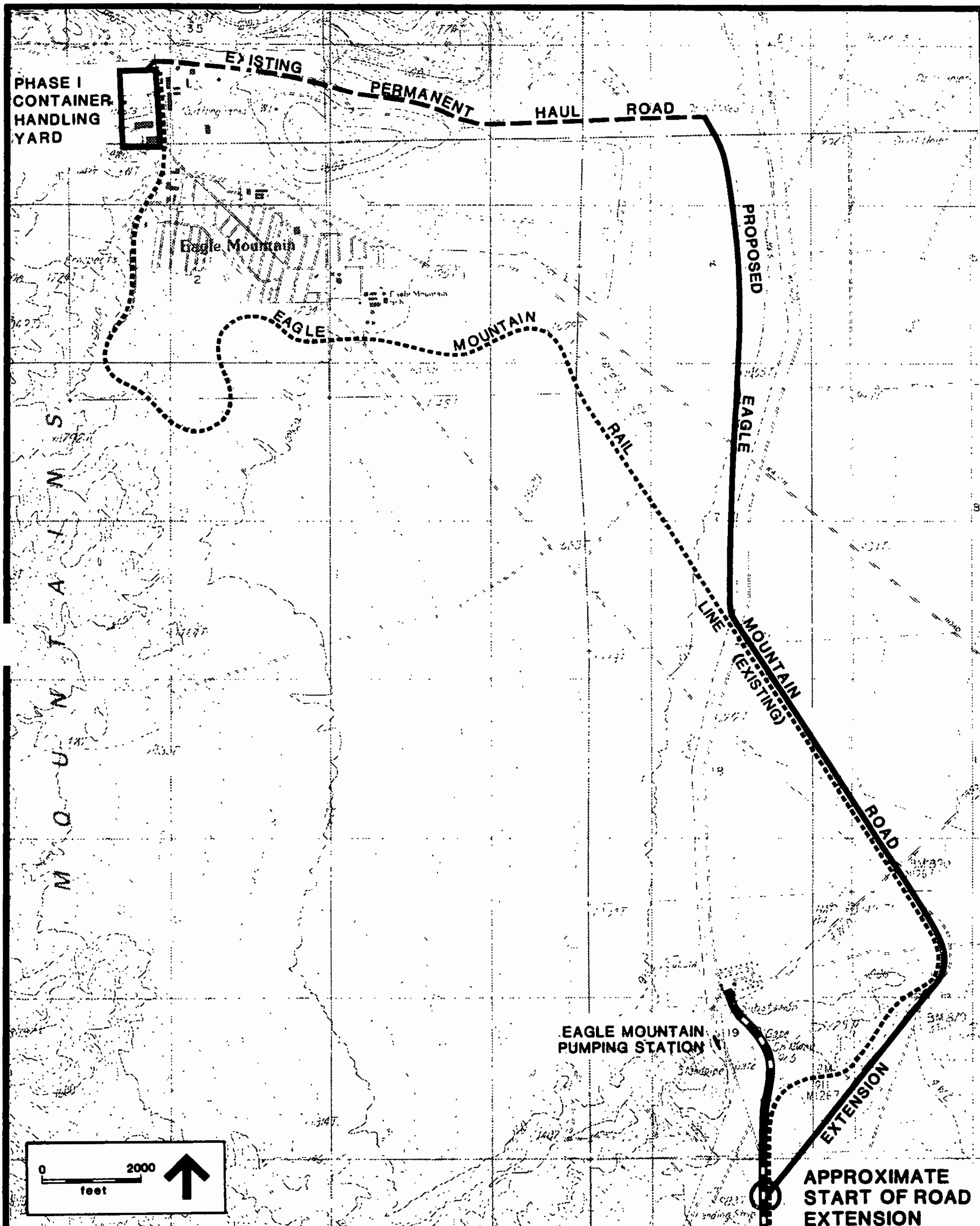


FIGURE 12. EAGLE MOUNTAIN ROAD EXTENSION AND PHASE I CONTAINER HANDLING YARD

RECON

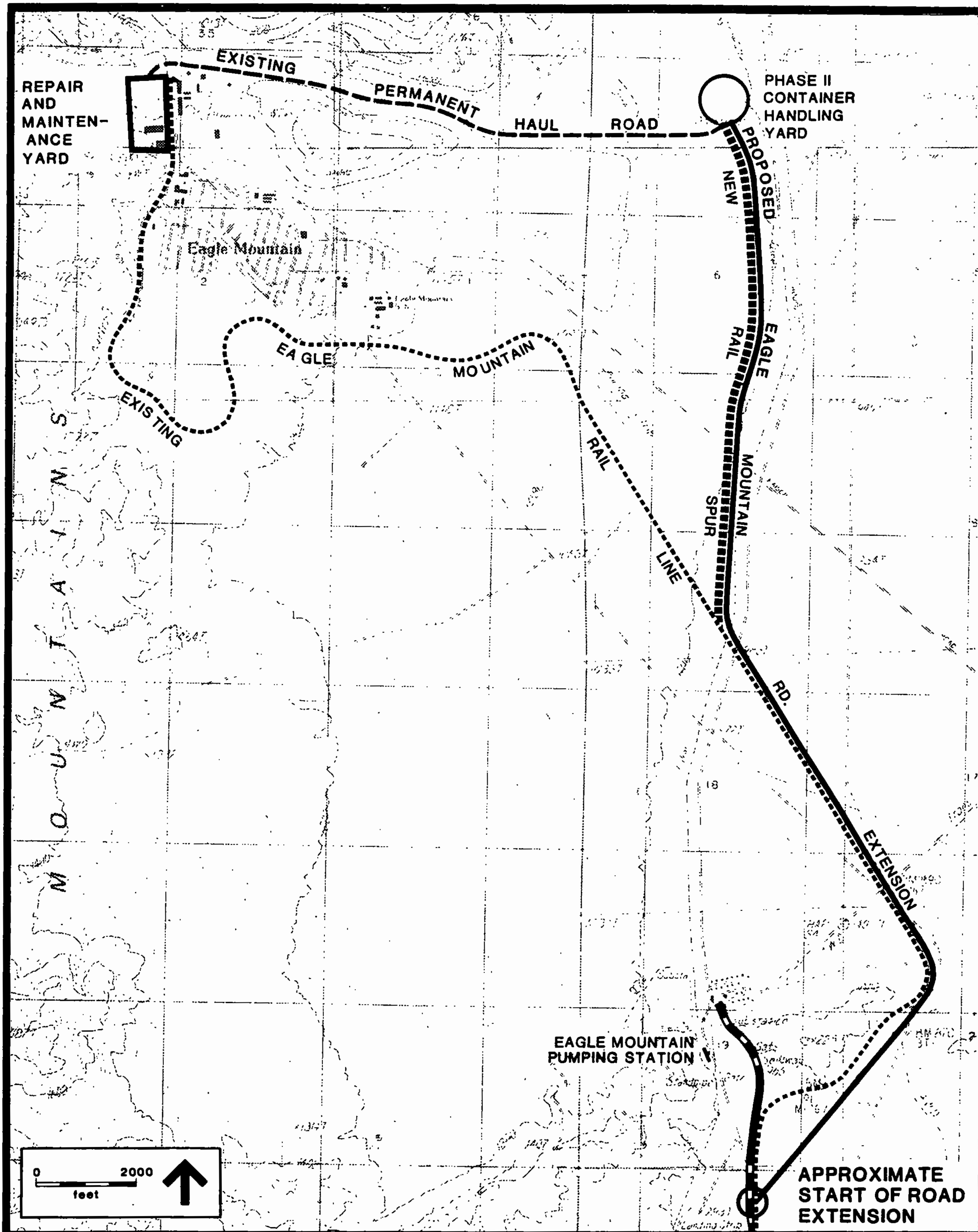


FIGURE 13. EAGLE MOUNTAIN ROAD EXTENSION, RAILROAD RIGHT-OF-WAY AND PHASE II CONTAINER HANDLING YARD

Ferrum Junction to the proposed Phase I container handling yard and/or repair and maintenance facility shown on Figure 12. At the beginning of the project, no more than one train per day would use this Phase I route. At a later date, up to six trains per day will be routed around the Eagle Mountain townsite into the proposed Phase II container handling yard via a rail line spur discussed below.

d. Rail Line Spur

Figure 13 shows the proposed new rail line spur. The new spur will begin just past the location where the proposed Eagle Mountain Road Extension and the existing railroad cross the Colorado River Aqueduct in S1/2S1/2 Sec. 7, T. 4 S., R. 15 E., SBM, and runs northerly to the proposed Phase II container handling facility in W1/2 Sec. 31, T. 3 S., R. 15 E., SBM. This portion of the right-of- way is approximately two and one-half miles long. The purpose of this spur is to route rail traffic around the townsite of Eagle Mountain into the proposed Phase II container handling yard.

4. Riverside County General Plan Amendment

The Eagle Mountain Landfill Specific Plan (SP) would amend the Riverside County General Plan and the Zoning Ordinance and Map to facilitate initiation of a landfill operation at the Eagle Mountain mine site. Figure 14 shows current land use designations found on the Open Space and Conservation Map of the Riverside County General Plan which affect the project site: Mineral Resources, Desert areas, Mountainous areas, and Areas Not Designated as Open Space (ANDOS). Those categories will be replaced by an SP designation supported by the SP exhibits and text. As shown on Figure 15, current zoning of the site includes the following districts: Mineral Resources and Related Manufacturing (M-R-A), Controlled Development Area (W-2), Natural Assets (N-A), and Manufacturing-Heavy (M-H). These individual zones will be replaced by an SP zone designation supported by an ordinance text which can be found in Section III of the SP. The SP zone is being created to support the addition of landfill and associated land uses on the project site.

The landfill will be designed and operated in accordance with all applicable permit requirements. The design of the landfill includes the use of a liner on the bottom and side slopes of the pit; a leachate collection, recovery, and treatment system; and a gas collection system. Mitigation measures for dust control and a number of other planning and monitoring requirements would also be included in the project. On-site drainage improvements that would affect the landfill will be sized to accept 100-year 24-hour duration precipitation events. The SP discusses the relationship of the above activities to the project.

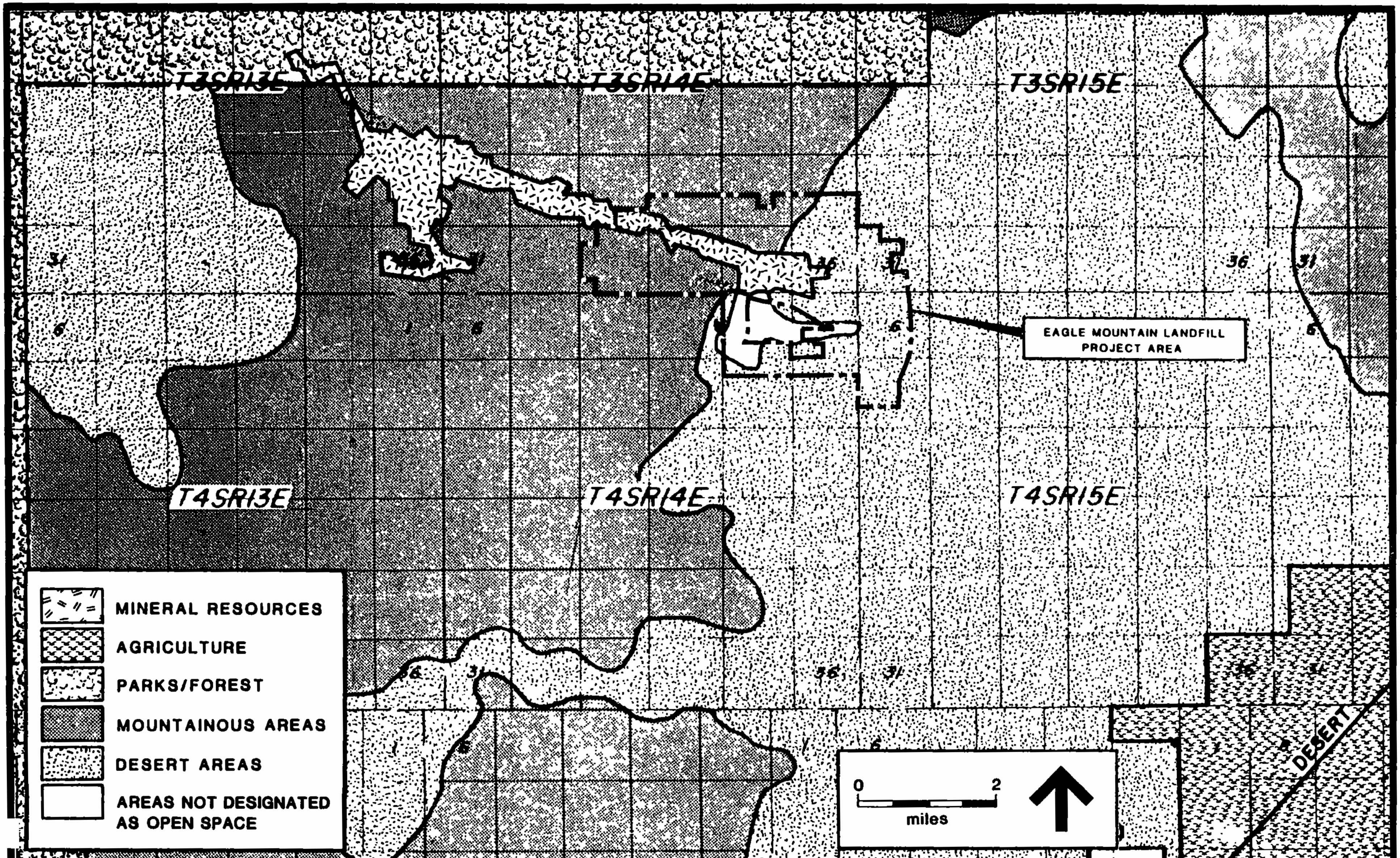


FIGURE 14. COMPREHENSIVE GENERAL PLAN OPEN SPACE AND CONSERVATION MAP

RECON

2/91

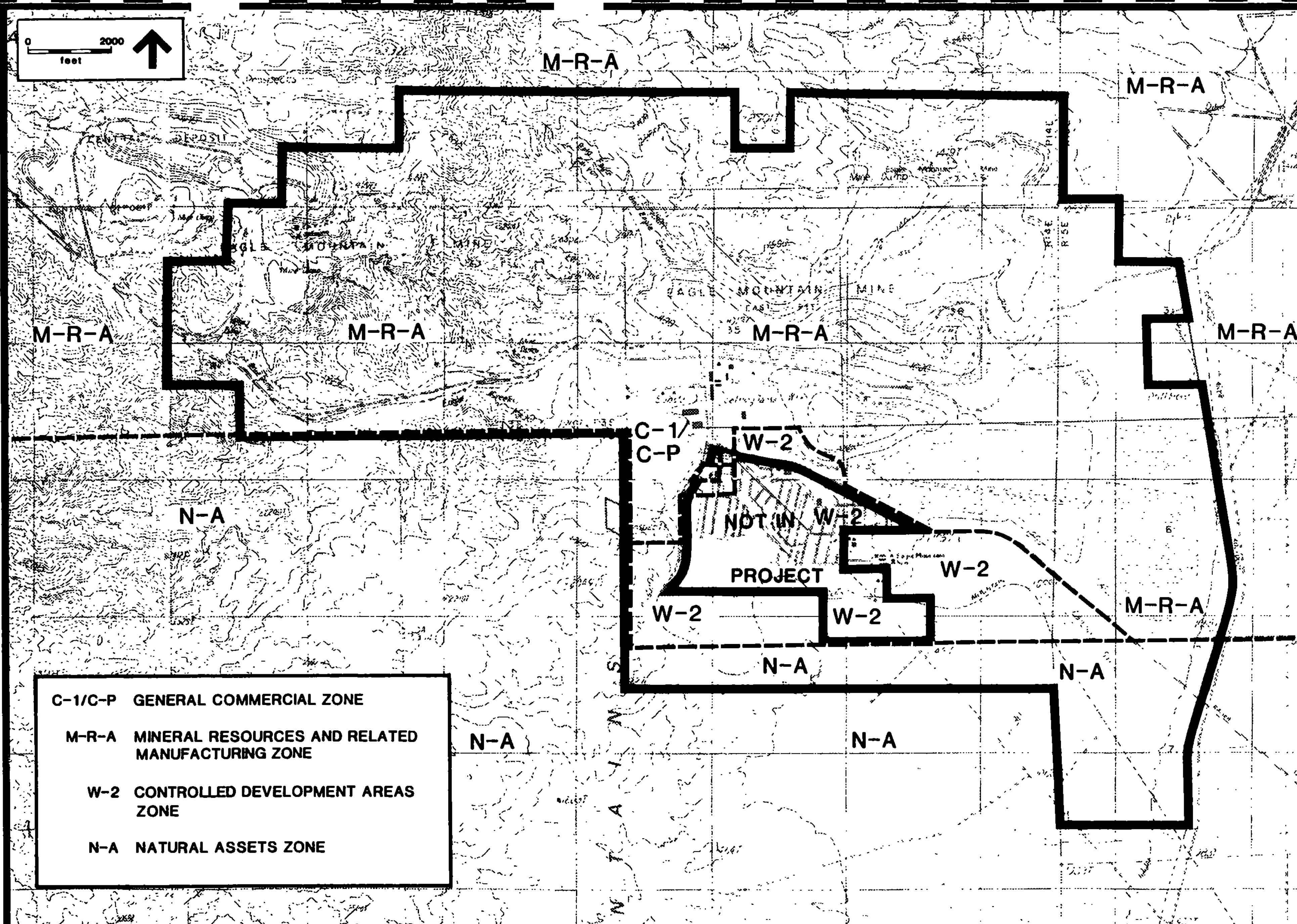


FIGURE 15. EXISTING PROJECT AREA ZONING

RECON

5. Project Operations

A typical day's operation at the landfill site involves the following sequence which reoccurs throughout the day:

- A fully loaded train will arrive at the marshalling yard. An overhead container-handling crane will position itself over the train and unload filled containers onto the container handling vehicles.
- The container handling vehicles will haul the containers to the working face(s) of the landfill where they will unload the containers, discharging the refuse from the rear of the container.
- Bulldozers and refuse compactors will move, spread, and compact the refuse and place the daily soil cover.
- The empty containers will be returned to the marshalling yard where they will be inspected prior to loading back on the train (either the same train they came from or another, depending upon the scale of operations). Damaged containers, or those scheduled for washing or periodic maintenance, will be delivered to the container-maintenance area.
- When the train is fully loaded with empty containers, it will return to Ferrum Junction.
- Trucks carrying containers will be unloaded in a similar manner to trains, with the containers being hauled to the operating face(s) on container handlers. Some standard transfer trucks that have an integral cargo box will drive under their own power to the operating face and be emptied by end dumping or by tipper.

Additional operations that will occur to support the above activities include the following:

- Road maintenance will involve the use of motor graders for the smoothing and leveling of unpaved haul roads. Water trucks will spread water on unpaved haul roads for dust control. Paved haul roads will be periodically cleaned with a road sweeper to reduce dust.
- Landfill preparation will involve preparation of areas by bulldozer, leveling by scraper and grader, placement of crushed rock or other material for contouring the cell, placement of the clay liner and placement of the synthetic liner where needed.
- Maintenance activities for equipment will include shop maintenance of mobile equipment; field preventive maintenance, lubrication, and fueling of mobile equipment; and container washing and maintenance as needed.
- At the end of an operating day, daily cover (coarse tailing or crushed overburden) will be transported by truck, conveyor, or scraper to the active working face(s) for placement over the day's refuse. Daily cover will be spread and compacted in layers at least six inches thick as per operating permit requirements. Water sprays may be used during the recovery of the cover from stock piles or during crushing for dust control.
- Drainage control facilities will be constructed periodically by preparing ditches, trenches, or other works to channel and direct runoff water away from the landfill.

- Leachate control and landfill gas collection piping will be installed to intercept and/or collect these fluids for treatment.
- Litter control crews will provide daily litter pickup and the movement of portable litter control fencing.
- Locally derived and random container loads of refuse will be inspected for hazardous materials and loaded into containers for delivery to the landfill face. Hazardous materials will be collected, temporarily stored (with the appropriate permits) and then transported off-site to a licensed hazardous waste disposal facility.

a. Landfill Site Facilities

Figure 16 shows the Eagle Mountain Landfill Specific Plan Area, which is divided into six planning areas. These areas are described below in Table 2.

TABLE 2
EAGLE MOUNTAIN LANDFILL
SPECIFIC PLAN AND PLANNING AREAS

Planning Area	Use	Acreage	Percentage of Site
1	Landfill area	2,272	48.4
2	Container handling–Phase I	251	5.3
3	Container handling–Phase II	340	7.2
4	Recyclable storage area	322	6.9
5	Coarse and fine tailing storage and process area	465	9.9
6	Open space	1,045	22.6
TOTAL		4,695	100.0

The SP describes the locations of these areas and their associated activities. All buildings shall have a minimum setback of 25 feet from the property boundary and a maximum height of 60 feet. Development standards for the container handling yard are described in greater detail in the Eagle Mountain Landfill Specific Plan. The facilities associated with these areas are described below.

Container Handling Yard

In Phase I, incoming refuse would be delivered by rail and truck to the container handling yard located south of the western portion of the East Pit. During Phase I, trains would use the existing

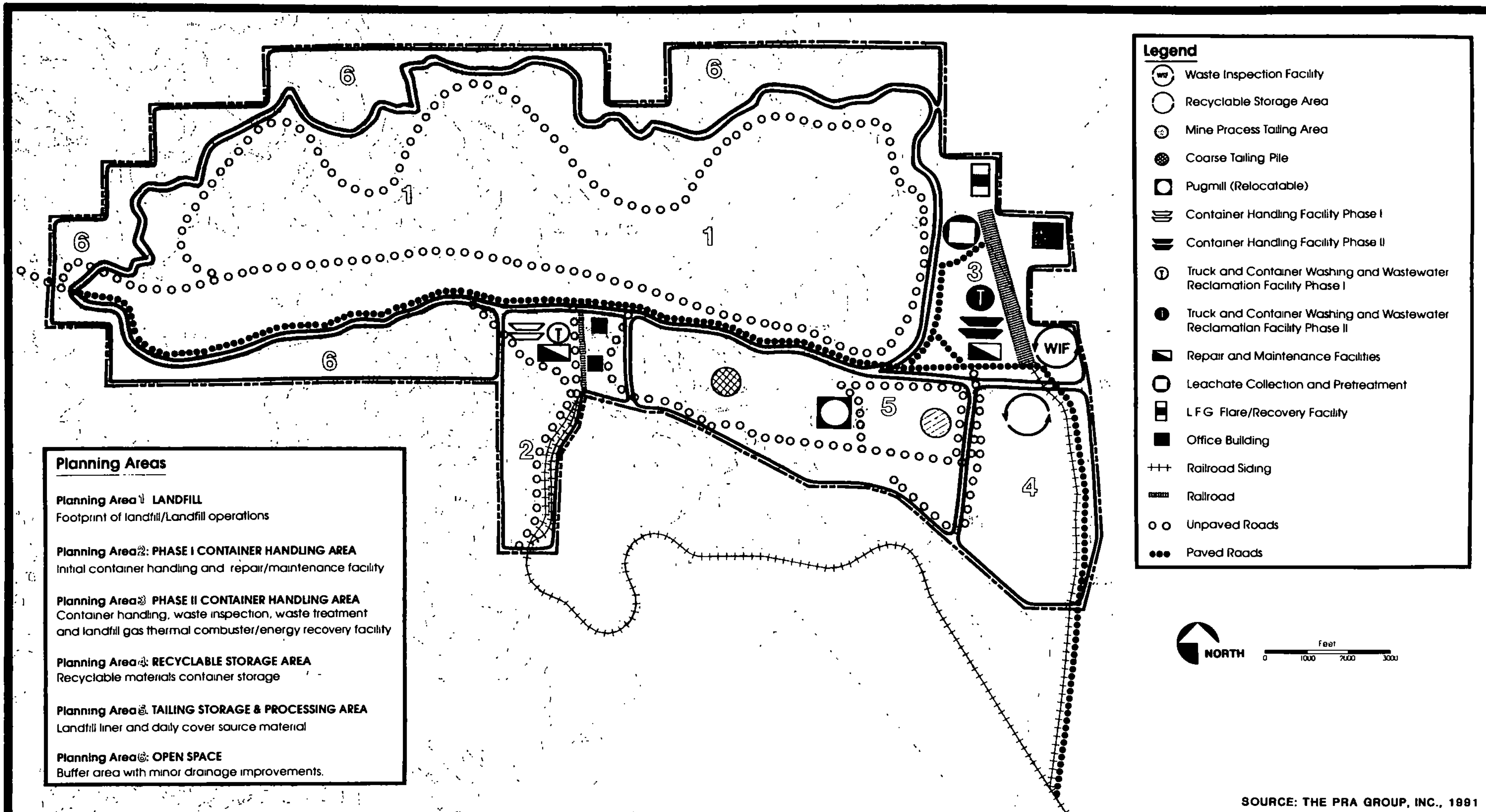


FIGURE 16. PROPOSED LANDFILL SPECIFIC PLAN AREA WITH DESIGNATED PLANNING AREAS

RECON

rail line south and west of the Eagle Mountain townsite and trucks would use the Eagle Mountain Road Extension, constructed east of the townsite, and the existing haul road (see Figure 12). The maximum capacity of the initial container handling yard would be approximately 4,750 tpd consisting of one train load of refuse per day (3,500 tpd) and an additional 1,250 tpd that would be delivered by truck.

In Phase II, incoming refuse would be delivered by rail and truck to the container handling yard located approximately one-half mile from the eastern boundary of the landfill (see Figure 13). Its maximum capacity would be 20,000 tons of refuse per day. During Phase II, trains would use a new rail line constructed east of the townsite and trucks would use the Eagle Mountain Road Extension. Upon the opening of the Phase II container handling facility, the Phase I container handling facility would cease to handle waste.

Although the capacity of the Phase I container handling yard would be less than the Phase II container handling yard, both container handling yards would contain approximately the following:

1) Railroad spur lines or sidings. Trains serviced in the Phase I container handling yard will be divided into two or three segments to accommodate the existing sidings. Sidings in the Phase II container handling yard, each up to 5,000 feet long, would be long enough to allow an entire unit train to be stationed without uncoupling cars and to allow locomotives to couple and uncouple at either end of the unit trains.

2) Container handling equipment. Large forklift-style movers or mobile overhead cranes would be used to move containers on and off trucks; overhead cranes would be used to move containers on and off train cars. Both types of equipment would be fitted with pollution controls on the exhaust to achieve the lowest possible emission rates. The containers will be placed on container handling vehicles and will be hauled to the working face(s) of the landfill where the containers will be emptied. An illustration of a container handling vehicle can be found in Appendix B of this draft EIS/EIR.

3) A waste screening station/inspection facility. This facility, located on or near the Phase II container handling yard, will be capable of receiving and inspecting local waste from Desert Center, Lake Tamarisk, and Eagle Mountain on the order of several tons per day in accordance with an approved hazardous waste load checking program. All other incoming refuse will have been inspected at the initial loading point. Random container loads of incoming refuse shall also be inspected at this facility.

Locally generated waste and random container loads will be delivered and spread on a concrete tipping floor and visually inspected for waste components that would not be accepted into the landfill. These materials will be segregated and stored in accordance with the appropriate regulations. A hand-sorting, visual inspection process is planned. Hazardous materials will be removed and stored in a small hazardous waste storage area for shipment to a hazardous waste disposal site. Nonrecoverables will be loaded into closed containers for transport to the working face of the landfill for disposal. Throughout this draft EIS/EIR, all references to a maximum tons per day shall include the two to three tons per day of locally derived materials.

All containerized waste received in the container handling area, either by rail or truck, will have been screened to detect the presence of radioactive materials and other hazardous waste. Detection of radioactive materials will be performed both at the materials recovery facilities (MRF) at the container loading point and prior to container discharge at the landfill. This will be accomplished by passing the refuse at the MRF or the containers at the landfill under a detection device to detect materials that are emitting radioactivity. If radioactive materials are detected, intensive manual inspection of the load using hand-held detection equipment will be performed. The offending materials will be segregated from the load and stored in accordance with applicable regulations pending disposal at a licensed facility.

Train and container handling operations would be conducted on a 24-hour basis. These operations include all actions involving delivering a train of cars, positioning of these cars, unloading and reloading of containers, movement of locomotives from one end of the train to the other, and removal of the train back onto the main line. Locational and low-pressure sodium lighting would be used to light these operations.

Energy Recovery Plant

When detectable quantities of methane are found in the landfill gas, MRC will conduct studies to quantify the production rate of methane and to determine other characteristics of the gas. Initially, landfill gas (LFG) recovered from the landfill will be destroyed in a thermal combustor. When a production rate of five million cubic feet per day of methane is achieved, MRC will institute studies to determine if the gas can be utilized economically. These studies will evaluate the use of gas for electrical energy production, the production of pipeline quality or liquified gas for shipment off-site, or the use of gas to power on-site equipment for use at nearby facilities. If it is determined that the methane can be economically utilized, MRC will proceed with the development of an energy recovery plant to replace the landfill flare system (see Planning Area 3 of Figure 16). This may be a reciprocating engine-generator or a steam plant to generate electricity and recover excess heat.

It is estimated that the LFG recovery system could initially generate approximately 16 megawatts of peak electrical power (at the onset of energy recovery operations). After 25 years of landfill operation (year 2017), the LFG recovery system could generate between 24 and 61 megawatts of peak electrical power.

If MRC determines that LFG cannot be economically used, MRC may decide to design, permit, and construct an oxidation catalyst system and later a urea injection system (or equivalent system) for the thermal combustor before the LFG generation rate exceeds 10 million cubic feet per day of methane. These studies will be updated at least every three years.

Repair and Maintenance Facilities

The existing repair and maintenance buildings would continue in use to maintain the containers, locomotives, railcars, vehicles, and other equipment used on the site (see Planning Area 2 of Figure 16). When necessary, these facilities would be used to maintain and wash vehicles and containers. Containers would be transported from the container handling yard to this area when maintenance or washing is necessary. Wash water will be collected in sumps and reused as necessary. When the water becomes soiled, it will be passed through an oil skimmer for the removal of floating oil and grease. Sludge and other solids will be settled out in a settling tank. A runoff collection system would be designed to convey runoff to a wastewater pretreatment facility. If, after treatment, this wastewater were found to be hazardous, the sump would be pumped into a tank truck and the water taken off site to a licensed disposal facility.

Wastewater Pretreatment Facility

The applicant proposes to construct one or more wastewater pretreatment facilities to pretreat leachate, LFG condensate, and surface runoff from the repair and maintenance facility (see Planning Area 3 of Figure 16). Pretreatment would be provided for biological oxygen demand (BOD) and organics. The "package plant" facilities would pretreat liquids from these sources via aeration, oil separation, and sedimentation tanks. After pretreatment, the effluent would be transported to the existing Kaiser wastewater treatment facility, used for dust control on unpaved roads, or allowed to evaporate. Figure 17 shows the water and sewer plan including booster pumps, water tanks, wastewater treatment facilities, septic tank, and existing and proposed sewer and water lines.

Storage of Recyclable Material at the Site

The SP designates a portion of the site for the storage of recyclable materials recovered from the waste stream at MRFs near the wasteshed for which there is no immediate market (see Planning Area 4 of Figure 16). These recyclable materials will be transported through this area via the proposed new road and rail spur and stored in an area which is surrounded by an existing rock berm. The material will be stored and stacked in shipping containers, each eight feet in height (the stacks will be no more than two containers high, for a maximum height of 16 feet). Double-stacked containers would not be visible except at great distances from higher elevations. The recyclable material shall remain in its original shipping container while within the designated area, and shall be limited to the northern third of the area in order to protect cactus habitat in the area south of the berm. Double-stacking of shipping containers is the maximum height allowable (County of Riverside 1991).

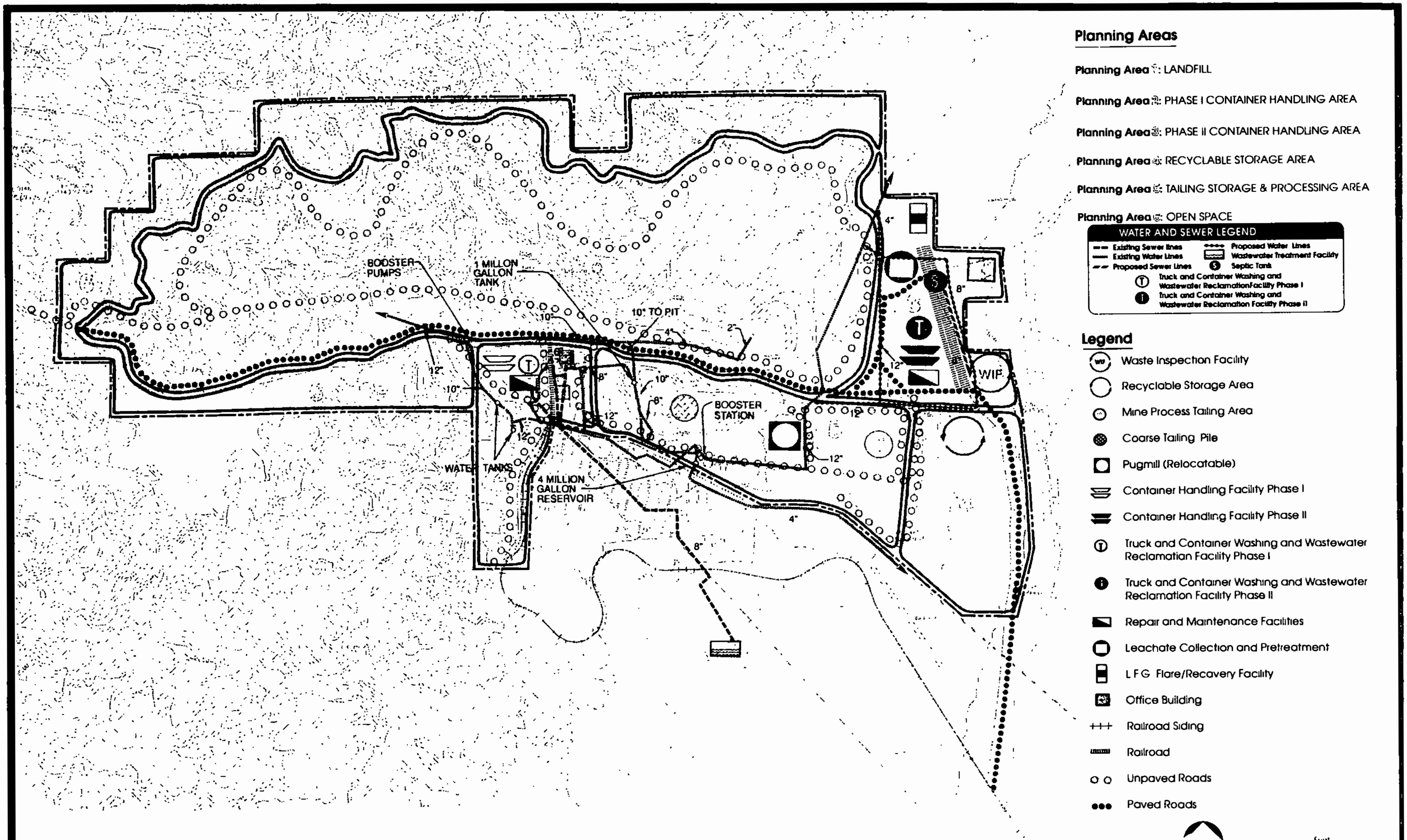


FIGURE 17. WATER AND SEWER PLAN

SOURCE: THE PRA GROUP, INC., 1991

b. Roads, Landfill Site, and Railroad Preparation

Prior to the commencement of Phase I landfill operations, several site development tasks would need to be completed.

Roads

The existing Eagle Mountain Road from the I-10 interchange to the MWD pumping station will be widened from its current two-lane, 20 feet to a two-lane, 40-foot paved road which will meet all applicable County of Riverside Transportation Department standards. This portion of the right-of-way is approximately seven miles long and will serve as the main access route to the proposed landfill site.

At the start of site development and prior to the beginning of landfill operations, the Eagle Mountain Road Extension will be constructed. This road will provide a routing for trucks as well as a new rail right-of-way that will eventually terminate in the Phase II container handling area. Upon completion of the Eagle Mountain Road Extension, which shall meet all applicable County of Riverside Transportation Department standards, Phase I operations will use this road for all truck transport into the site. Truck traffic on Kaiser Road or the (now abandoned) Kaiser truck road to the site will not be permitted. They will then traverse over the existing main haul road to the Phase I container handling area for off-loading of containers. Some vehicles may be directed to the landfill face for off-loading.

When a rail volume of more than one train per day is achieved, the new spur leading to the Phase II container handling yard will be constructed for train traffic. Trucks will still use the Eagle Mountain Road Extension for access to the site, but will be off-loaded at the Phase II area. Although the emphasis will be shifted to the Phase II area at traffic volumes greater than one train per day, the Phase I area will be kept open as a marshalling area for use as required for emergencies and maintenance. The existing rail terminus will continue to be used for the delivery of materials and supplies, for access to the maintenance buildings, and for locomotive refueling.

Landfill Site

The construction of additional facilities at the existing rail terminus at Eagle Mountain would be required. This would involve the construction of new tracks parallel to the existing tracks, paving the area to permit the use of container- handling cranes and equipment, and construction of a vehicle scale facility. Also, the preparation of the container laydown area for recyclable storage in the unused tailing pond area would be necessary. A small tipping floor and waste sorting area would be needed to receive and inspect trash from the local area.

The preparation of the landfill footprint, involving scaling of loose rock, leveling, and grading of the pit is also necessary prior to commencement of landfill operations. This includes the installation of the clay liner, a composite liner in sections of the landfill, and the installation of LFG and leachate collection facilities. In addition, soon after waste disposal operations commence, LFG and leachate treatment facilities shall be constructed; electrical, water, and sewage distribution systems shall be installed within the processing area. Groundwater monitoring wells shall be installed, with wells added as landfill operations expand. The construction of permanent drainage works and temporary diversion works both on and around the landfill operating area are needed. The existing offices, maintenance shops, laboratory and warehouse need to be refurbished, and the erection of security lighting and fencing is needed throughout the site.

Prior to the Phase II operations of the landfill (three to five years after start-up), additional work would be required, primarily at the east end of the project area. Additional tracks and container handling areas would be developed to process the additional waste tonnage per day. Up to 16,000 feet of rail tracks would be required. The container handling areas would be paved to permit efficient unloading of containers by straddle crane. An office complex of trailers would be constructed and landscaping installed. A more permanent LFG and leachate treatment facility would be constructed and additional sewage holding tanks would be required.

Railroad

The existing Eagle Mountain rail line will be used to transport up to one train per day into the site. The existing terminus (modified to add additional spur[s]) will be used for this train during Phase I operations. When a volume of more than one train per day is achieved, the new spur leading to the Phase II operations container handling yard will be used for train traffic.

Prior to the use of the existing Eagle Mountain rail line, repair, upgrading, and maintenance activities, though minimal, must be accomplished. Recent inspections of the line show that it is in relatively good condition primarily as a result of the excellent construction and maintenance standards that were applied during its operation. Further, the very dry climate in the desert has kept tie rot to a minimum.

The specific activities required are as follows:

Track Alignment. Although the heavy-gauge track presently installed is in good condition, subsidence and earth movement has caused some sections to come out of alignment. The track in these areas will be realigned using a rail tampering and/or gauge plates. Some small sections of track may need to be replaced. These operations are usually conducted from the rail right-of-way using standardized rail construction/maintenance equipment.

Tie Replacement. A number of ties will have to be either replaced or plugged to accept new spikes. Although high-quality ties were installed in the past, there has been no tie maintenance since 1986. In this period of time, some of the ties have been subjected to dry rot and will require replacement. Additionally, tie maintenance during the final days of the rail operation was minimal, and some spike holes have become enlarged. It is intended to replace about 11,000 ties (out of a total of some 250,000). Other ties will be "plugged" at the enlarged spike holes using wooden plugs or an injected foam to permit their continued use. Plugging closes and strengthens the oversized hole so that a spike can be driven into the tie.

Ballast Regulation. Regulation of the ballast on the existing right-of-way will be required for the entire length of the track. This will be accomplished by using a "ballast regulator" which is a machine used to loosen, level, redistribute and compact the stone ballast on the line. This is required as some of the ballast has been eroded, other has been shifted so as not to provide adequate support to the ties. A ballast regulator is a machine that rides on the rails, and while moving, performs the above operation. The ballast regulator also removes vegetation growing in the ballast.

Culvert Maintenance. Drainage is vitally important to the integrity of a rail right-of-way. At Eagle Mountain, many of the existing culverts have been partially or completely filled with debris and vegetation. Others have had the earthen support around the inlet or outlet (or both) eroded away. Still others were abandoned during the final stages of rail operation, and must be reinstalled. It is proposed to conduct culvert cleaning operations using a high pressure water jet to flush debris from the pipes. Repair and replacement will be accomplished by placing additional earth beneath those areas that have been eroded. New culverts will be installed by excavating the road bed, installing the new culvert pipes, and back filling and reconstructing the road over them.

Bridge Repair. Several of the bridges on the line have had moderate erosion around the footings. The supports of others (particularly the wooden bridges) have become loosened and require strengthening. These bridges are primarily located north of Interstate 10. Excavation around the damaged or missing footings followed by replacement of the sub-base with ballast or concrete will be required. Similar work will be required at non-bridge locations near the mine site that were washed away during a storm in the summer of 1990.

Vegetation Control. Vegetation, including trees, has become established in the right-of-way particularly near the southern terminus of the line near Ferrum Junction. These trees will be cut back from the road bed using chain saws, axes, etc. Vegetation growing elsewhere on the right-of-way such as sage brush or grass will be removed by hand if not handled during the ballast regulation activities.

Oiler Maintenance. Oilers are installed at curves on the track and when activated by passing rail car wheels inject a small squirt of grease onto the track to reduce wheel-track friction.

These oilers have become clogged with dry grease, and must be cleaned out by hand and refilled with fresh grease prior to operations commencing.

Endangered Species Protection. As part of the program to ensure minimal impact on endangered species, particularly the desert tortoise, certain activities such as the installation of special culverts for rail under-crossings and tortoise fencing will be conducted. This construction work will be performed in a similar manner to culvert maintenance. Greater detail concerning desert tortoise mitigation measures is discussed in the biology section of this draft EIS/EIR.

c. Landfill Operation

The main portion of this draft EIS/EIR, and of the various permits and actions necessary for the project, focuses on the establishment of a Class III landfill (nonhazardous municipal solid waste and construction debris waste) at Eagle Mountain using the existing large open pit and related disturbed areas formerly operated as an iron ore mine. The landfilling of the area will reclaim it to a more natural landform. This site would serve as a regional site for the land disposal of solid waste generated primarily in southern California.

State law and regulations (Chapter 15 of Division 3 of Title 23 of the California Code of Regulations [CCR]) regulate the disposal of four types of wastes including hazardous waste, designated wastes, nonhazardous solid waste, and inert wastes. This project will accept only nonhazardous solid waste and inert wastes. As defined in Chapter 15, nonhazardous solid waste consists of garbage, trash, refuse, paper, rubbish, industrial waste, ashes, appliances, food waste, and other materials provided that such wastes do not contain wastes which must be managed as hazardous waste or wastes with soluble pollutants in concentrations that exceed water quality objectives. In the event that radioactive materials are detected, the County health department would be notified immediately. Such materials would be removed in accordance with procedures specified in the project's solid waste facilities permit.

Processing and Transfer Stations

The size, location, and operation of any processing and transfer station would have to be determined by the community in which it is located. For a typical to large processing and transfer station of 3,000 tpd capacity, a site of about 10 to 30 acres would be necessary and an enclosed structure of about 100,000 square feet would be needed to house the operation. Given the size requirements and the operational preference or desirability to locate adjacent to a rail line or spur, it is likely that transfer stations would be located in existing industrial areas. The shipping containers are 40 x 8 x 8 feet and each can carry about 25 tons of compacted trash (when loaded for a rail haul). Thus, a typical transfer station of this size would generate about 140 containers per day, or enough to load 14 train cars, which would be a typical train length.

The general operation of a processing and transfer station would include the following steps:

1) Delivery of Refuse by Local Truck. The same public or commercial waste haulers that currently carry trash would deliver it to a processing and transfer station. Source-separated materials would be delivered separately to the processing and transfer station for specific handling. As with a landfill, the trucks would be weighed when they enter the facility.

2) Tipping Floor. The waste would be dumped onto a concrete floor by the delivery trucks. On the tipping floor, the waste would be spread and examined by workers. Any unacceptable materials, which include liquid waste, hazardous waste, sewage sludge, incineration ash, radioactive, biological, or infectious waste, or other special solid wastes would be diverted for special handling in accordance with procedures established in solid waste facilities permits which govern the operation of these facilities. Residual materials for recycling could be removed on the tipping floor.

3) Waste Separation. After the waste has been inspected for the occurrence of hazardous materials, it may, depending upon composition, be processed for the removal of recyclable materials. Recyclable recovery may occur by manually removing bulky materials such as cardboard or wood from the waste while it is on the tipping floor. More sophisticated techniques for the removal of recyclables will include manual and mechanical processing of waste using shredders, picking belt conveyors, air and gravity separation devices, and magnetic and/or electronic separation equipment. The purpose of the recyclable separation is to remove as much of the recyclable material as is feasible.

4) Compaction. Workers would load the residue into a large compactor which would compress it and load it into the transport containers. The containers are the same as large intermodal transport containers.

5) Loading. A large container handler would load the containers onto waiting railcars. Each railcar, designed to carry these containers, holds 10 containers stacked two high.

There are several possible variations on this description. For example, in some systems, solid waste is moved by conveyor belt through a room where workers manually remove material that is either unacceptable or that can be recycled. The loaded containers could be moved and loaded onto the railcar by overhead crane. In any event, all processing and transfer stations involve some screening of waste and then consolidate the waste so it can be handled in larger volumes.

Rail Transport

MRC proposes that up to a maximum of six trains per day would be delivered to the project site. The project would use the main Southern Pacific rail lines and locomotive power for delivery of containers from the metropolitan areas to Ferrum Junction. MRC will arrange scheduling of refuse unit trains with Southern Pacific on a contractual basis to prevent any conflict between ongoing rail operations and trains being utilized for the landfill project.

The daily maximum of six trains would traverse the Banning Pass and Coachella Valley and make the run from Ferrum Junction to Eagle Mountain. From Ferrum Junction to the site, trains would be powered either by MRC or Southern Pacific locomotives.

Unit trains would consist of one or more diesel electric locomotives carrying up to 14 railcars. The railcars would be "twin stack," similar to those manufactured by Gunderson and Greenbrier Intermodal. Each car would be 256 feet long, coupled at each end to the leading or following car. Because of this length, the cars are not rigid, but are articulated to allow them to negotiate rail curves. Each car has a well-type configuration which holds two 40 x 8 x 8 foot containers. Thus, each car carries 10 containers, and each train, 140 containers.

Each train would be less than 4,000 feet long and carry approximately 3,500 tons of refuse. This length is somewhat shorter than most main line trains and approximately the same length as the trains previously used by Kaiser which formerly carried ore from the Eagle Mountain mine to Fontana.

Truck Transport

During the beginning phase of operations, an estimated 1,250 tpd of solid waste would be delivered to the landfill from local areas in Riverside and San Bernardino counties (see above). This would generate about 60 daily trips to the landfill. During maximum operations, an estimated 4,000 tons per day of solid waste would be delivered to the landfill. This would generate approximately 200 daily round trips (400 one-way trips).

The refuse disposal trucks would be three-axle truck tractors or two-axle semitrailers carrying the filled solid waste containers. Alternately, specially designed top loading trucks fitted with solid doors could be used. In either case, the solid waste load would be fully enclosed within a solid container. Typical payload weights would be 40,000 to 45,000 pounds and total loaded weight would be approximately 80,000 pounds.

Truck traffic to the Phase I container handling yard would use Interstate 10 and the existing Eagle Mountain Road, located approximately two miles west of Desert Center. From Eagle Mountain Road, approximately six miles north of Interstate 10, the new Eagle Mountain Road Extension would provide access directly to the Phase II container handling yard. The last two miles of this private road would be realigned adjacent to the new rail spur to enter the Phase II container handling yard. A new traffic control (stop sign or light) would be placed at the intersection of this new road and the existing County-maintained Kaiser Road.

Container Transport to Working Face of Landfill

From the container handling yards, the containers of refuse would be transported to the working face of the landfill by container handling vehicles. These special trucks will be semitrailers capable of carrying one or two containers. They will be self-dumping (i.e., they will have a dumping platform added to the trailer configuration). Hoist mechanisms will be hydraulically operated, with the hydraulic cylinder located on the trailer with the remainder of the hydraulic system located on the truck tractor and powered by the truck engine. The dumping platform will be designed to discharge refuse from the rear of the trailer.

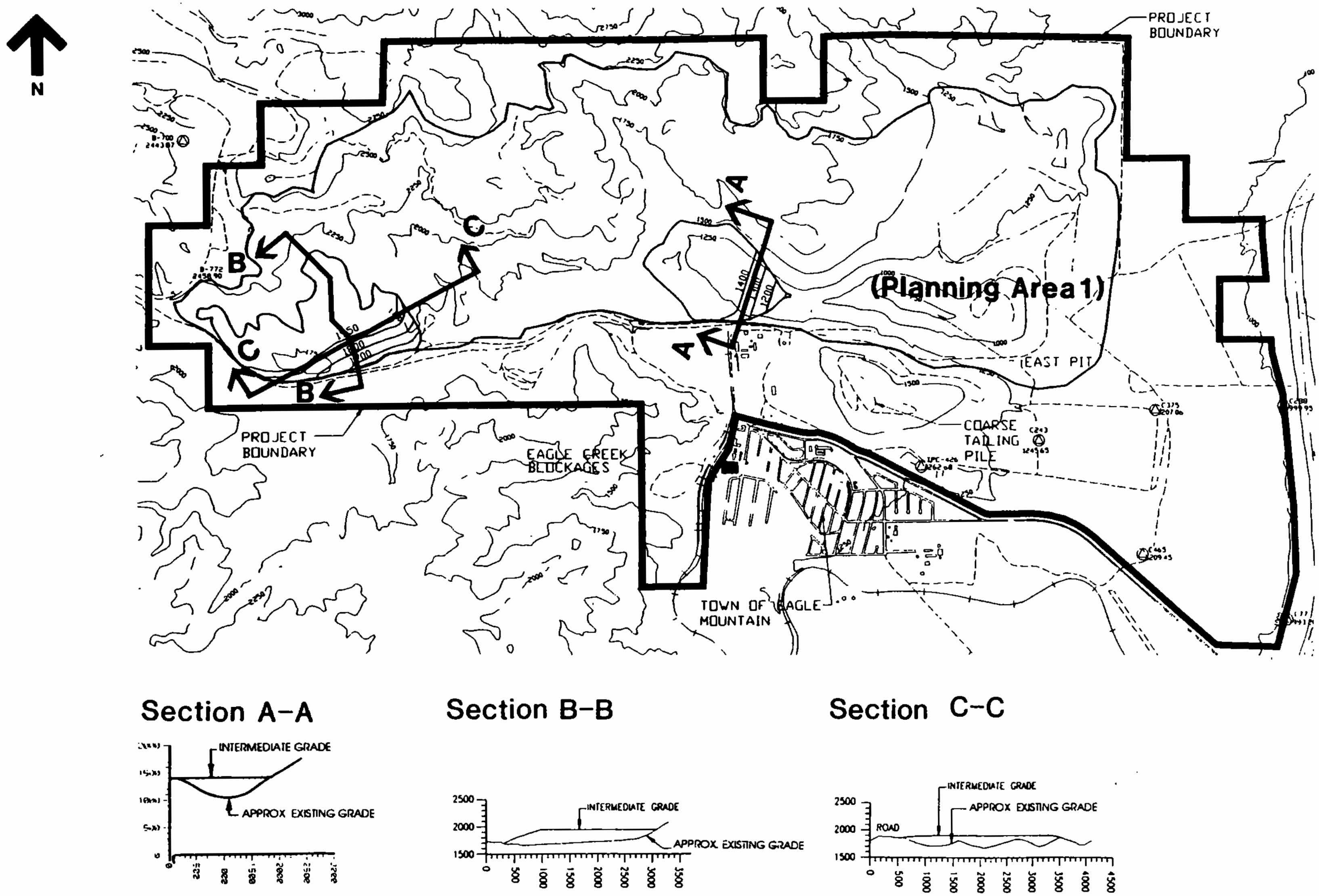
All container-handling vehicles will be designed to operate at a maximum speed of 40 miles per hour. This maximum speed, vehicle gearing, traffic pattern, and haul road design will enable these vehicles to maintain an average speed of 25 miles per hour (not including maneuvering time).

Both permanent and temporary haul roads would be constructed within the landfill site. The existing haul road previously prepared for mining activities will be utilized for both Phase I and II. This permanent road would end in temporary haul roads which would continue to the working face(s) of the landfill and other operating areas.

Deposit of Refuse and Daily Cover

Project Sequencing. Landfill operations would start in the southwest portion of Planning Area 1 to an elevation of 1,950 feet MSL. After a series of drainage improvements have been made, landfill activities will be initiated in the westernmost portion of the East Pit. The first phase of the project sequencing would last from 0 to 10 years (Figure 18). The second phase of the project sequencing (approximately 11 to 75 years) would continue from the west end of the East Pit to the west end of the landfill to final elevations (Figure 19). The third phase of the project sequencing (approximately 76 to 85 years) would fill the northeasterly portion of the landfill area to its final elevation (Figure 20). The final phase of the project sequencing (approximately 86 to 115 years) would fill the East Pit to its final elevation (Figure 21). This sequence of landfill operations is not to be confused with the Phase I and II operations which reference a level of tonnage of waste haulage per day which triggers the construction and use of the Phase II container yard.

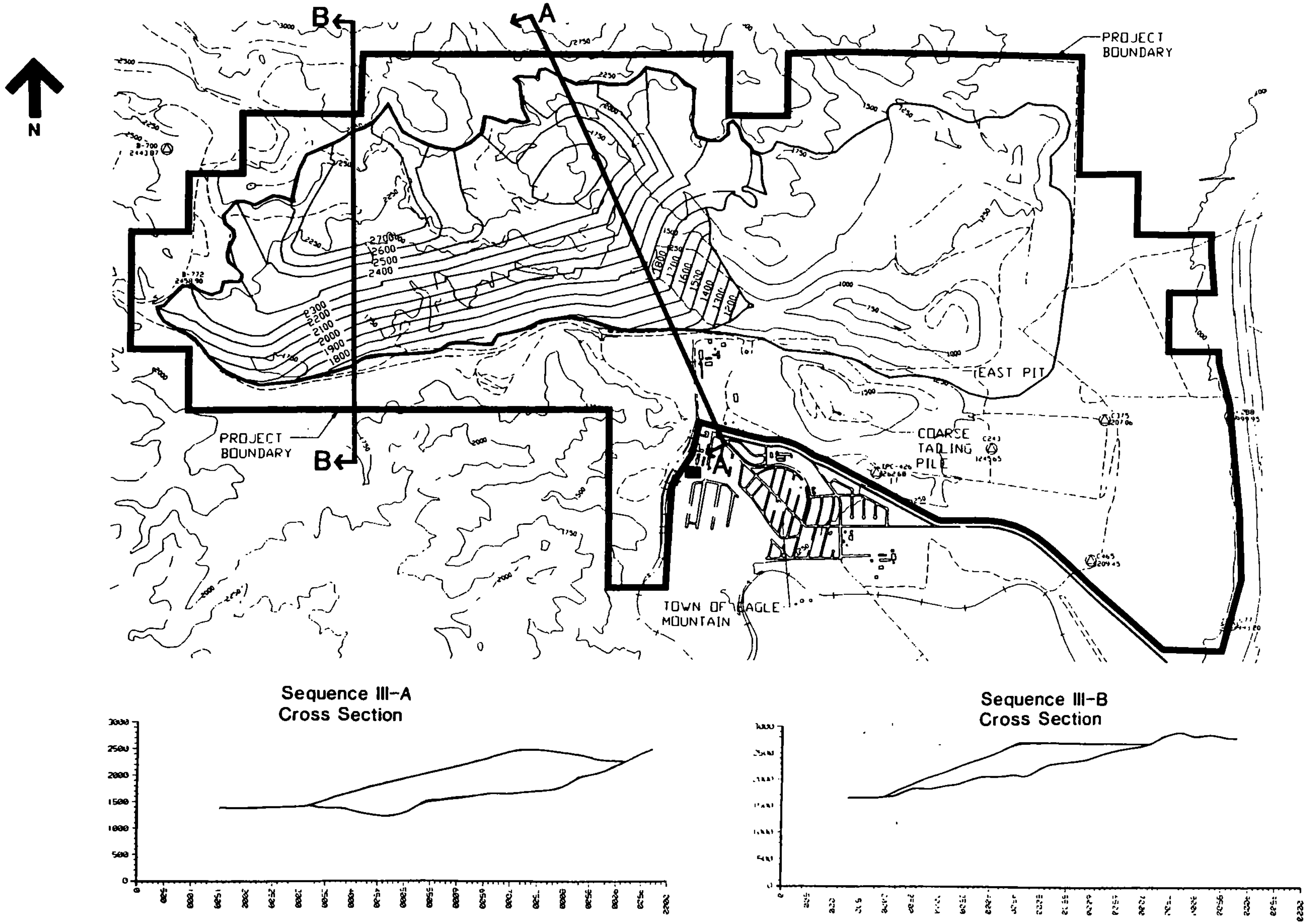
As shown in Figure 22, the surface of the landfill would be built up in cells or lifts. A lift is a series of cells of approximately the same height at the same elevation. The cells form the basic building blocks of the landfill. Composed of waste compacted by heavy equipment, the resulting cell is enclosed by soil on all sides as refuse is deposited and then covered each day. When the final grade of the landfill is reached, it would be buried with a final cover as described below in the "Final Cover" subparagraph. Landfill operations would be conducted during daylight hours only (approximately 10 to 14 hours per operating day).



SOURCE: SMITH, PERONI AND FOX

FIGURE 18. LANDFILL SEQUENCE I, 0 - 10 YEARS

RECON



SOURCE: SMITH, PERONI AND FOX

FIGURE 19. LANDFILL SEQUENCE II, 11 - 75 YEARS

RECON

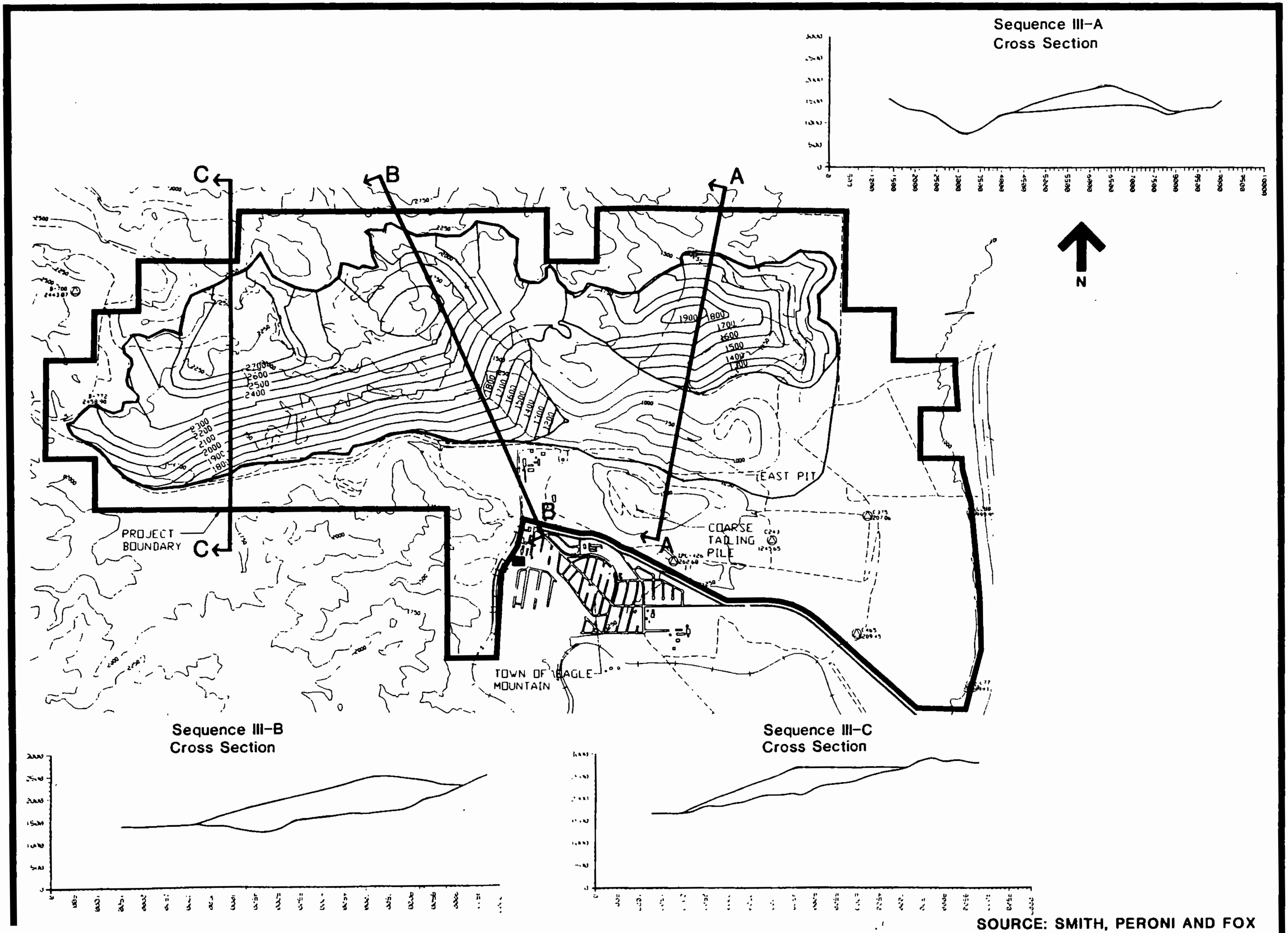
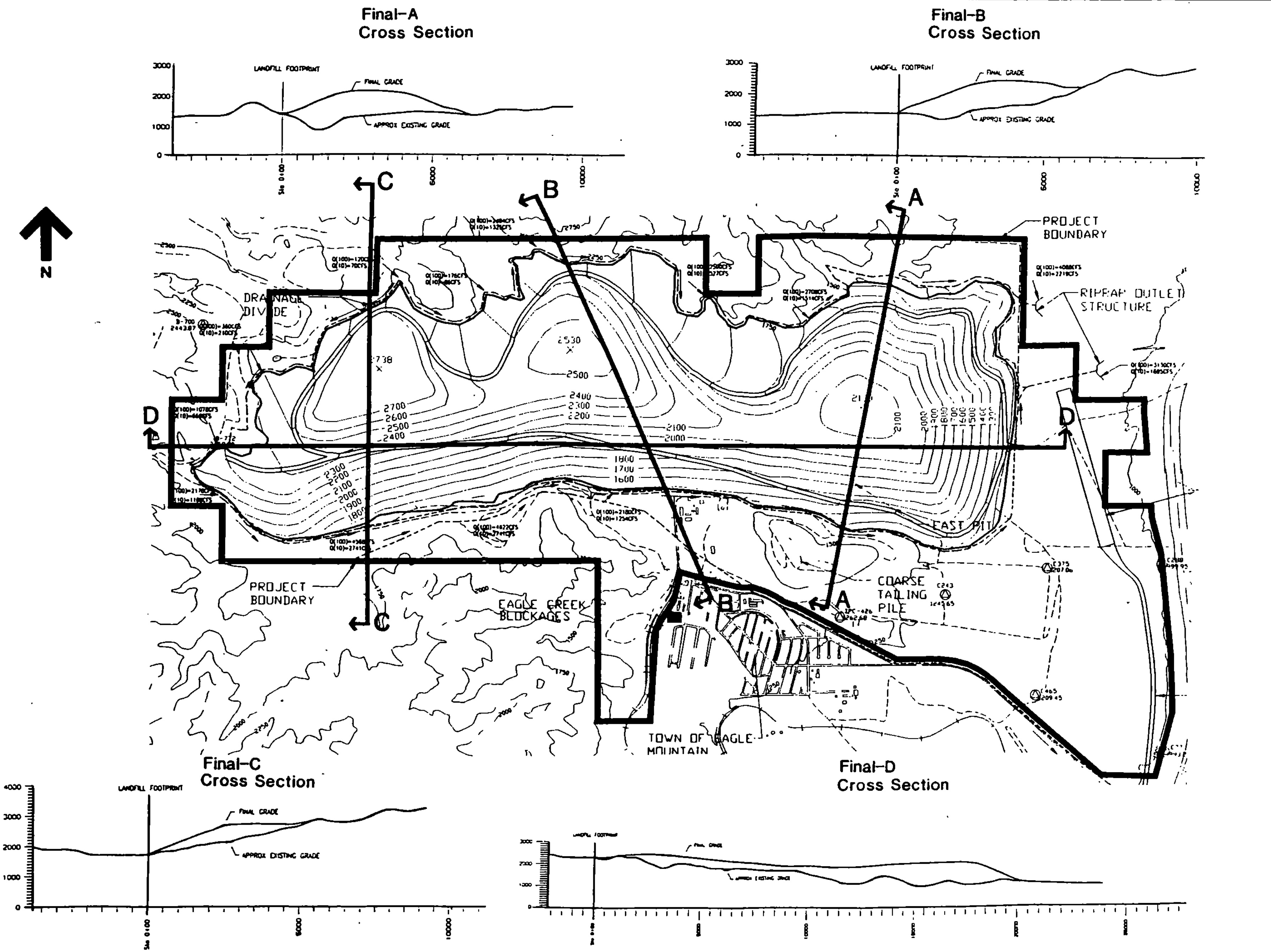


FIGURE 20. LANDFILL SEQUENCE III, 76 - 85 YEARS

SOURCE: SMITH, PERONI AND FOX

RECON



SOURCE: SMITH, PERONI AND FOX

FIGURE 21. FINAL LANDFILL SEQUENCE, 86 - 115 YEARS

RECON

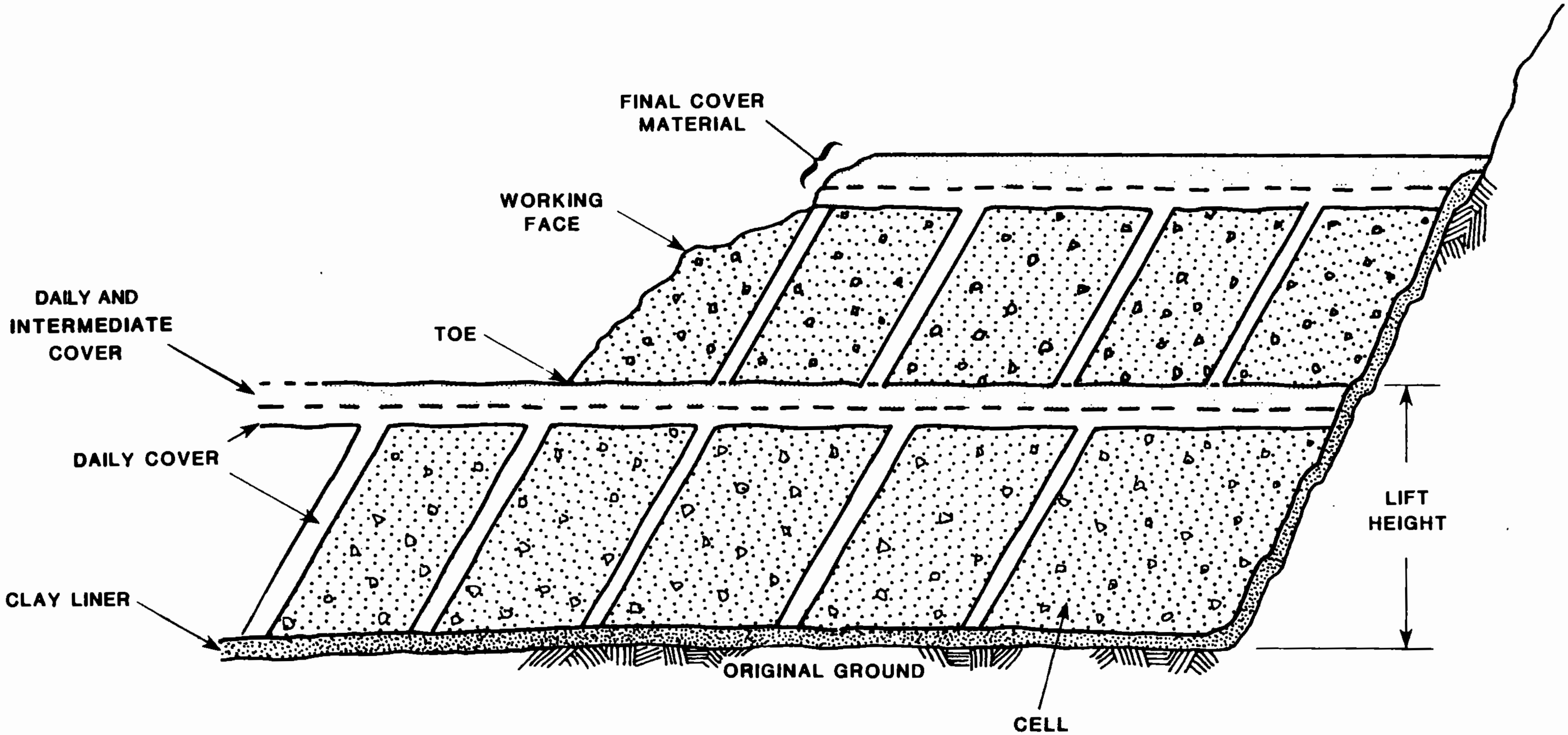


FIGURE 22. SCHEMATIC LANDFILL CROSS SECTION (NOT TO SCALE)

Deposit of Refuse. The container transport trucks would bring closed containers from the container handling yard to the working face of the landfill. The containers to be used are, for the most part, standard rear-loading intermodal containers that will be loaded by compactors and unloaded as described below. Certain existing transfer stations are not configured to utilize containers. In these cases, top-loading trucks will be used. These will be top loaded, but end-dumped in the same manner as the containers. The net weight of the refuse in the top-loaded units will be less, because the degree of compaction possible for end-loaded units cannot be achieved with top-loaded units.

Refuse will be removed from shipping containers using self-dumping vehicles. These consist of trailers designed to carry one or two containers (if two, the containers will be loaded side-by-side). The trailers would be hauled to the working face of the landfill by a tractor unit. At the landfill face, the container platforms on the trailer will be hydraulically elevated to a sufficient angle to allow the refuse to discharge by gravity from the rear of the container. Hydraulic power for the tipping mechanism would be provided from the tractor unit. During full operations, depending on the choice of transport vehicles, between 17 and 34 container handling vehicles would be used on a daily basis, with three or four additional vehicles available on a standby basis.

Refuse from some over-the-road trailers may be removed using a tipper. A tipper is a stationary platform which elevates a refuse trailer so that the refuse is discharged from the rear of the trailer. A semi-truck/trailer drives onto the tipper in the horizontal position. The trailer is uncoupled and fastened securely to the frame of the tipper. The tractor is driven off of the tipper. The tipper is then hydraulically elevated at one end, tipping the trailer to about a 60-degree angle allowing the contents to spill out of the end of the trailer by gravity. When the trailer is empty, the tipper returns to the horizontal position, the tractor is recoupled and the unit returns to the container handling area.

Containers or trailers will be emptied as close to the working face of the landfill as possible. Crawler tractors will push loads from where containers are emptied to the working face, where refuse will be spread to an average depth of two feet. At full operations, six tractors will be required for the project.

After the crawler tractors have spread the refuse, the refuse would be compacted to a density of about 1,000 to 1,250 pounds per cubic yard by diesel-powered landfill compactors. As the final elevation of individual cells is reached, crawler tractors would roll and level the refuse, and the cover would be placed. The compactors planned for use at the project site operate with a 315-horsepower diesel engine and have a width of almost 15 feet. The compactors would compact a minimum 2,000 tons of refuse per 10-hour day. Ten compactors would be in operation when the landfill is operating at maximum inflow.

The working face of the landfill would have a height of about 18 feet. The front of the cell would have a slope of about 6:1 (horizontal to vertical), and the side slopes would be 3:1. Its width and daily length would depend on the type of transport and tipping equipment used and the quantity of refuse received. With the use of self-dumping vehicles, the width of the working face would be 230 feet and the cell would advance about 245 feet per day.

At the end of each day's operation, a minimum thickness of six inches of compacted daily cover material would be placed over the refuse using either crawler tractors or self-propelled scrapers passing directly over the refuse. Three additional crawler tractors would be required and may also be used to doze cover material from stockpiles located near the uncovered refuse.

Previous mining activities generated large quantities of waste material (coarse mine tailing or crushed rock and overburden) on the site which would be used for daily and intermediate cover. Figure 11 of Appendix B shows the spoils area locations. Approximately 2,000 cubic yards of coarse tailing would be used for daily cover and 2,000 cubic yards for daily construction of internal haul roads. It is estimated that 120 million cubic yards of cover will be needed for the entire project.

The coarse tailing pile on the south side of the East Pit contains an estimated volume of 38 million cubic yards. This material can be used directly as daily cover without processing of any kind. Existing piles of overburden will be crushed to a similar size using a portable crusher and front-end loader. Either or both sources of material can be used for daily cover, the choice of which being made based on transportation logistics. Even though much overburden will be covered by refuse, additional sufficient quantities (up to 152 million cubic yards) exist at elevations above the refuse level outside the landfill footprint that can supply the project for its entire life. All of the overburden that would be used is located in Planning Area 1 of the SP. A portable crusher will be placed near the overburden piles used to provide cover and moved, as required, to limit the haul distance to the working face of the landfill.

A pugmill may be used strictly for the blending and conditioning of the fine tailing to be used as the clay liner in the bottom of the landfill.

As filling operations proceed, drainage and elements of the gas collection system would be constructed. These are discussed below and explained more fully in Appendix B, pages 20-30.

Leachate Control, Monitoring, and Treatment

Leachate is liquid that passes through or comes into contact with wastes, or is produced by the decomposition of organic wastes. The physical characteristics of the incoming refuse can have a significant influence on leachate composition and production. Municipal solid waste typically has a moisture content of about 25 percent (SCS Engineers 1990). The refuse coming into the Eagle Mountain landfill will undergo sorting to remove recyclable materials at transfer stations near refuse sources and will be compacted for placement in shipping containers. No free liquid will be accepted as incoming refuse. Sorting activities will provide an opportunity to remove containers of liquid waste improperly contained in the solid waste stream. Yard waste and other high-moisture wastes may be removed from the refuse as part of governmental composting regulations further reducing the overall moisture content of the refuse. The hot, dry climate of the area will result in evaporation of significant quantities of water from the refuse during and after work at the active face. Compaction and incidental drying of refuse during handling could further reduce the original moisture content.

The leachate control and removal system includes a foundation layer, the liner, a blanket drainage layer, leachate collection sump, storage and treatment facilities, and groundwater monitoring wells. The design, size, and capacity of the leachate control and removal system including ancillary pumps, storage tanks, and piping will be approved by the appropriate approval agencies.

The Liner. California Code of Regulations, Title 23, Division 3, Chapter 15, regulations state that new Class III landfills shall be sited where soil characteristics, distance from waste to groundwater, and other factors will ensure that no impairment of beneficial uses of surface or groundwater occur beneath or adjacent to the landfill. Although factors such as annual precipitation, background quality of groundwater, and current and anticipated use of groundwater indicate that there will be no impairment of beneficial uses of groundwater, the entire area underlying refuse will be lined.

A preliminary determination by the Riverside County Solid Waste Division would require that MRC construct a composite liner consisting of clay and a high density polyethylene (HDPE) flexible membrane over certain portions of the landfill. The area likely to require the composite liner would be the lowest elevations of the landfill; that is, those areas in which leachate is most likely to accumulate. All other areas underlying refuse (floor and side slopes) would be lined with a clay liner. Both the composite liner and the clay liner would use the reserve of low-permeability fine tailing from previous ore mining operations at the site.

When compacted to 90 percent of maximum density, the tailing material displays laboratory permeabilities ranging from a minimum of 1.0×10^{-8} centimeters per second (cm/sec) to a maximum of 8.8×10^{-6} cm/sec. Quality control testing will be performed during liner placement to ensure that only material with permeability below 1×10^{-6} cm/sec is used for liner composition in accordance with Chapter 15 regulations. Other physical properties of the tailing material are consistent with its use as a landfill liner, and no hazardous concentrations of metals or other substances have been found to be contained in the material (Hanson 1990; SCS Engineers 1988a, 1989a).

Groundwater Monitoring Wells. To provide ongoing groundwater monitoring during landfill operations and following landfill closure, a number (to be determined by the RWQCB) of groundwater/monitoring wells will be installed. These wells will be designed to detect movement of pollutants from the area of the landfill in groundwater. For this purpose, wells are generally placed downgradient close to the margin of the landfill. Water quality at these points of compliance is compared with background water quality.

California Code of Regulations, Title 23, Division 3, Chapter 15, specifies that a sufficient number of wells should be installed to monitor background water quality and water quality at points of compliance. The wells must be logged by a geologist and must be able to accurately monitor water level and chemical indicator parameters. Prior to installation of the groundwater monitoring system, approval of the proposed program will be obtained from the RWQCB.

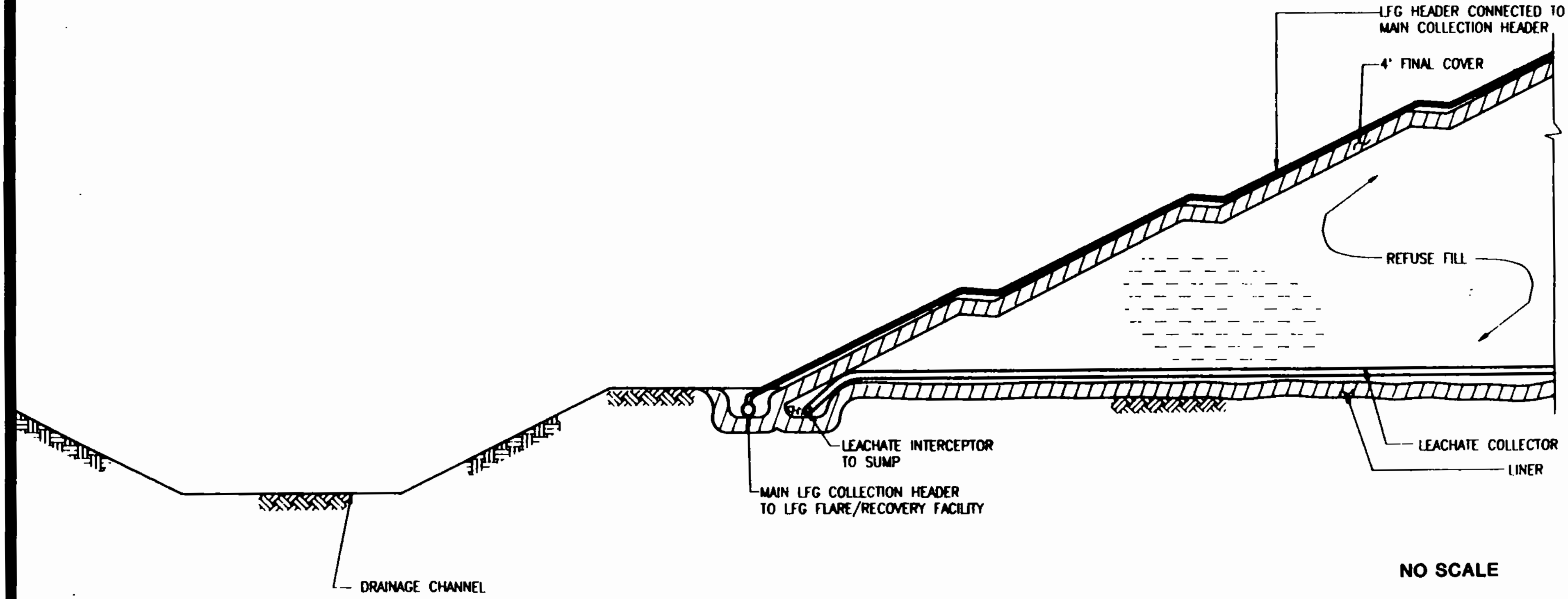
Construction methods and details of the groundwater monitoring wells will depend on whether they are placed in alluvium or in bedrock. Alluvial wells will be drilled using air or mud rotary methods. The bedrock wells will be drilled using air rotary methods in conjunction with a downhole percussive tool. Samples will be collected during drilling to provide information on lithology. A log of each well will be prepared by an on-site geologist working under the direct supervision of a geologist registered in the state of California. The well log will include information on well location, driller, drilling equipment, borehole diameter, depth, dates, and times that various operations were performed, and geological observations.

The wells will be sampled and analyses regularly performed as specified by the RWQCB in its waste discharge requirements. It is anticipated that laboratory analyses will consist of a number of tests selected from among the ones being performed for background groundwater monitoring (described in the subsection on background groundwater quality monitoring).

Leachate Collection. Preliminary studies using the HELP model (U.S. Environmental Protection Agency n.d.) and the Thornthwaite method (Thornthwaite and Mather 1957) indicate that little or no leachate will develop over the life of the landfill. Therefore, the leachate collection system will be designed based on minimum engineering requirements. Leachate collection will commence as soon as the project begins during Phase I and continue for the life of the project and after. The topography of the site will require two different types of leachate collection. Details of the leachate control system are shown in Figures 23 and 24.

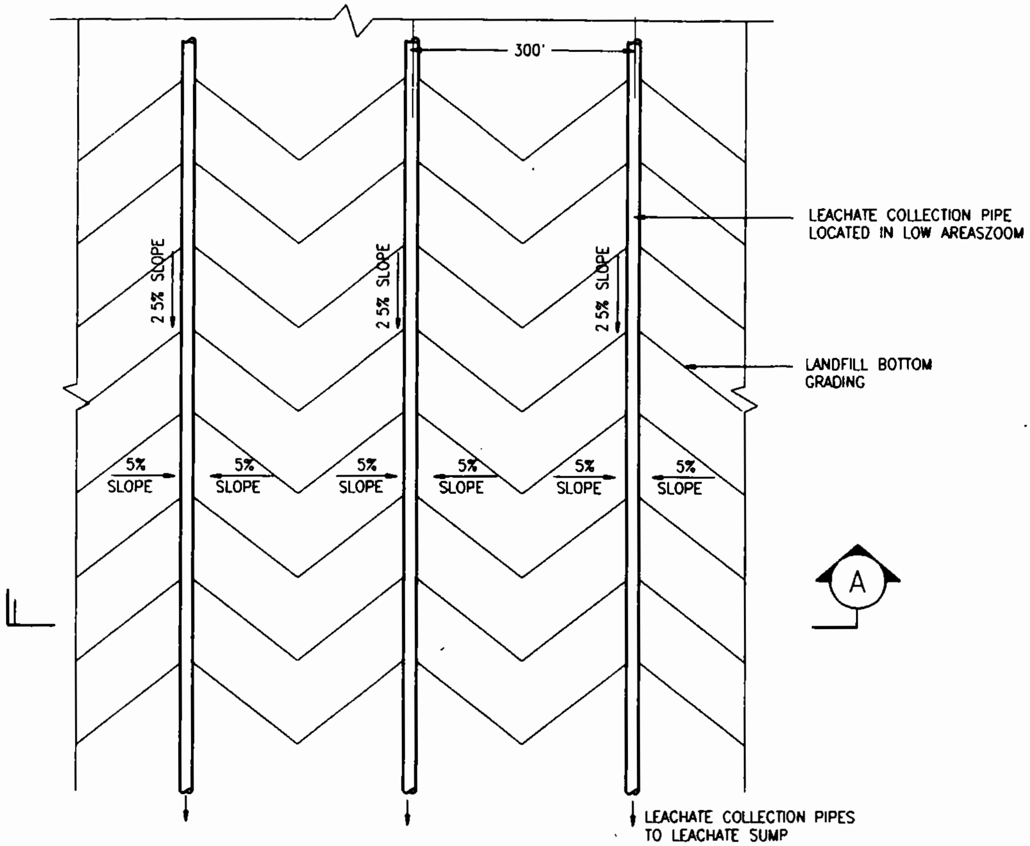
The East Pit area will require pumping if any leachate is formed there (Figure 25). The pit area of the landfill will be pumped out as necessary and any leachate will be deposited in the main header and collected east of the landfill. The pump will be portable and used only if leachate develops in the pit.

The west and northeast portions of the landfill site may be suitable for gravity flow (Figure 26). A series of gravity drains will be formed in the low areas, above the liner, to collect any leachate that might form in the landfill. The gravity collection system will consist of collector pipes

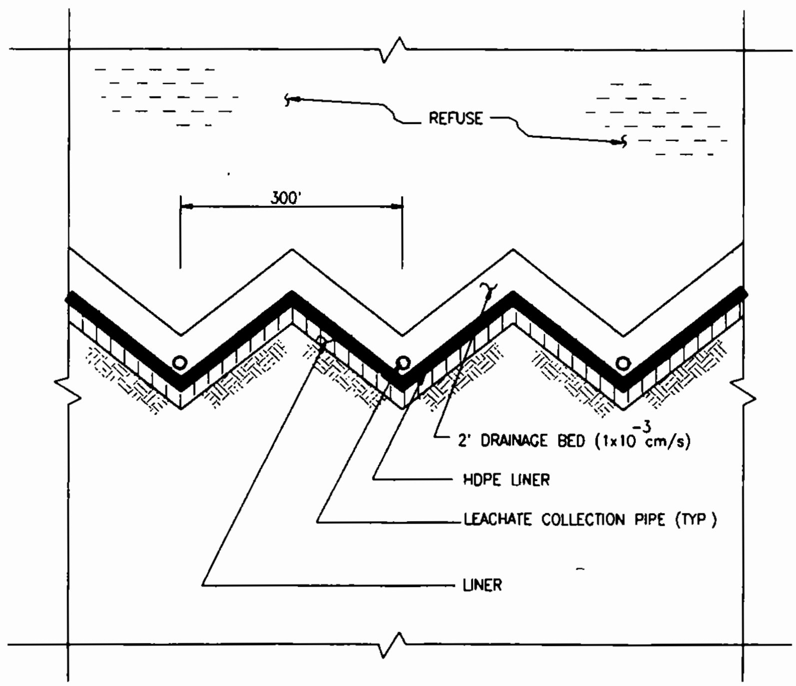


SOURCE: SCS ENGINEERS

FIGURE 23. LEACHATE COLLECTION SYSTEM DETAILS



LEACHATE COLLECTION SYSTEM – PARTIAL PLAN
NOT TO SCALE

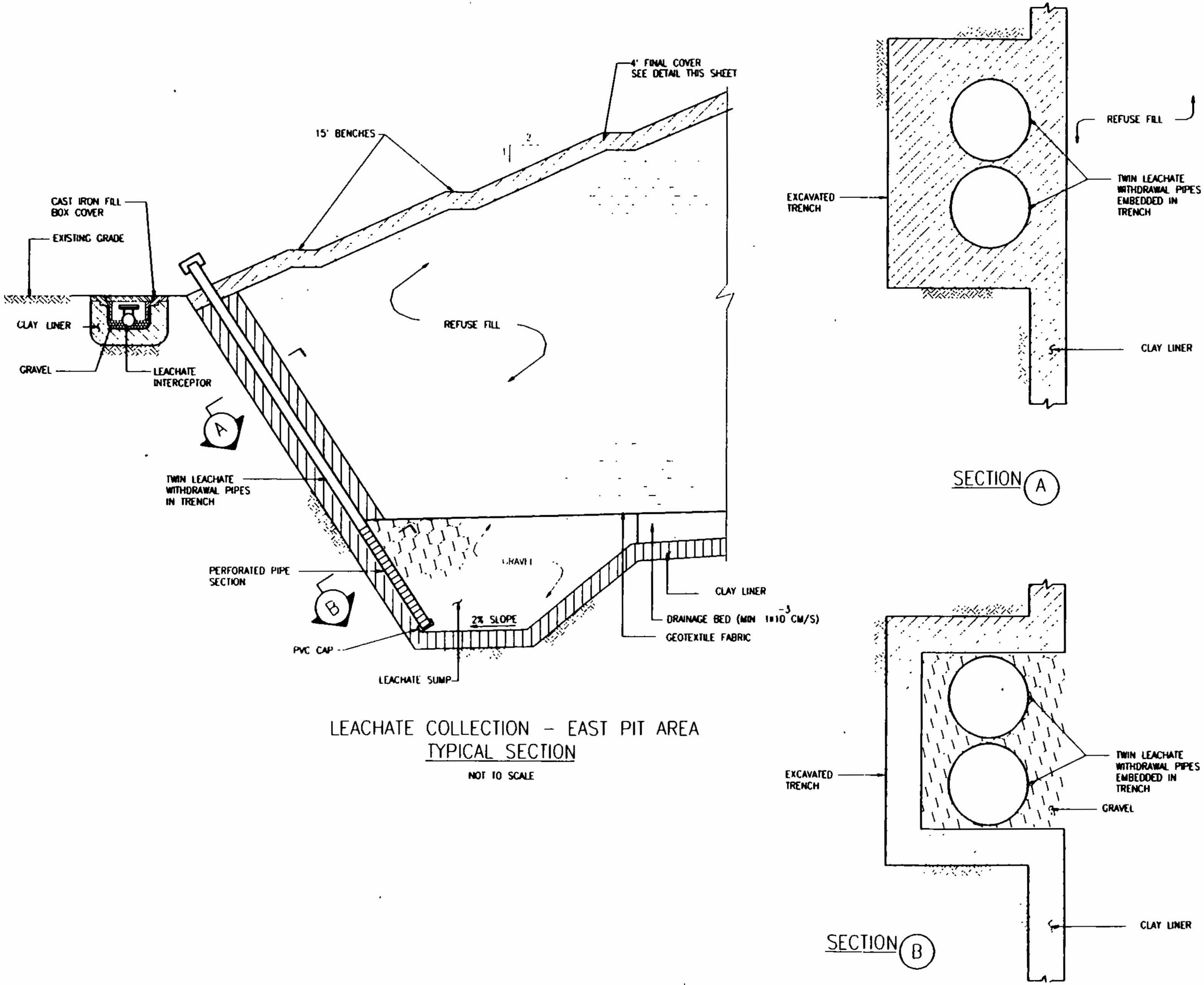


LEACHATE COLLECTION SYSTEM – SECTION A
NOT TO SCALE

SOURCE: SCS ENGINEERS

FIGURE 24. LEACHATE COLLECTION SYSTEM PARTIAL PLAN AND CROSS SECTION

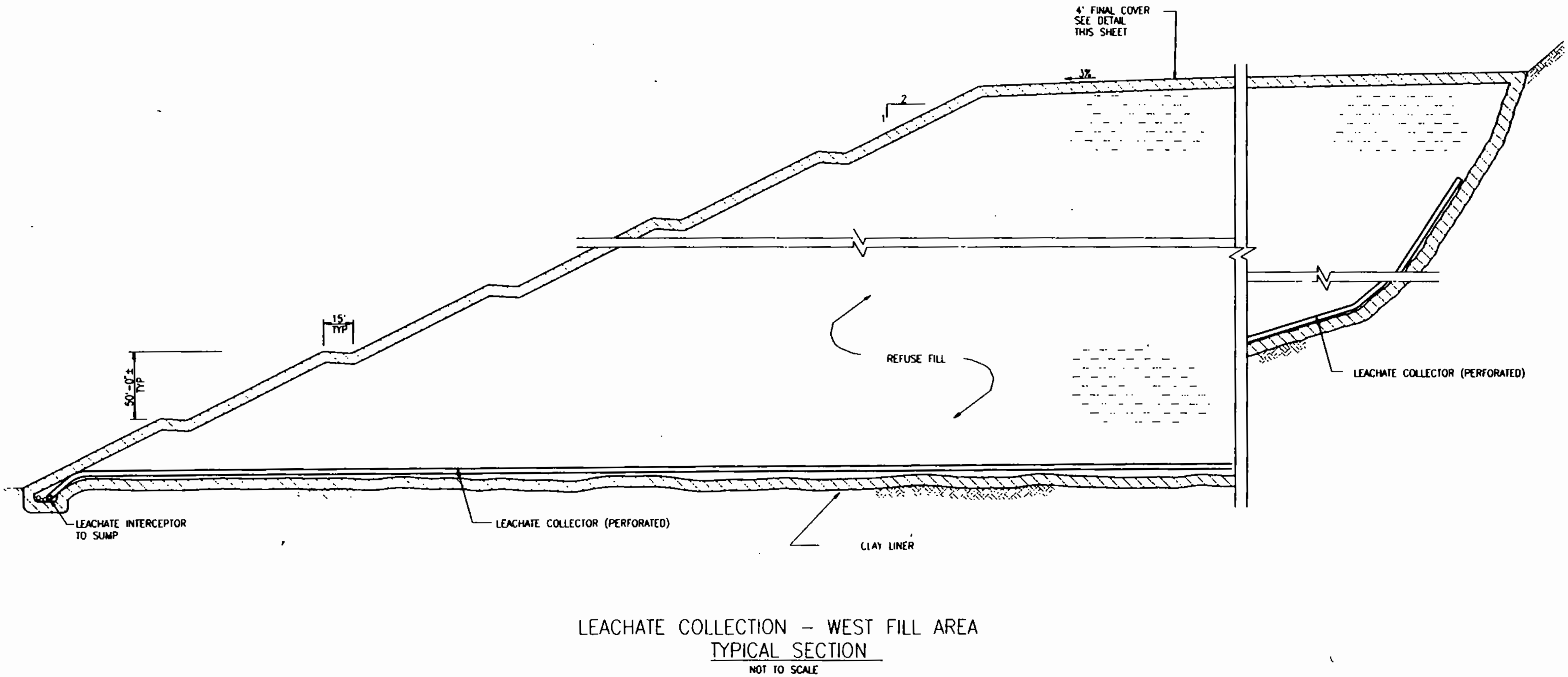
RECON



SOURCE: SCS ENGINEERS

FIGURE 25. LEACHATE COLLECTION SYSTEM IN EAST PIT AREA

RECON



SOURCE: SCS ENGINEERS

FIGURE 26. LEACHATE COLLECTION SYSTEM DETAILS IN WEST FILL AREA

RECON

located in the landfill and header pipes located at the edge of the landfill draining to a main collection point east of the landfill. If required, leachate pumps will be installed.

Leachate Treatment. If within parameters that make the leachate nonhazardous, it may be used on unpaved roads for dust control or placed in open-topped containers to evaporate. Alternatively, it will be delivered by truck to the existing sewage treatment plant for disposal. If the treatment does not render the effluent nonhazardous, it will be stored on-site in an approved manner as a hazardous waste and periodically disposed of in accordance with applicable regulations.

If there are noticeable floating organics (oil) on the leachate, it will be passed through a commercial oil skimmer for the removal of the offending compounds. Recovered organics will be collected and stored as hazardous waste and disposed of in accordance with applicable regulations at a licensed facility. If high BOD is measured, the leachate will be passed through an aerator to oxygenate the water. This will lower the BOD. These "pretreatment" facilities will be either permanent or portable, the selection of which will be based on the location of the leachate collection, the quantity of leachate, and other factors. Details of the pretreatment facilities will be determined during the permitting process. Ultimately, permanent facilities will be used.

The existing wastewater treatment plant formerly serviced the town of Eagle Mountain and the industrial complex at the mine site. It is presently in operation at a reduced capacity. The design capacity is 180,000 gallons per day, although its permitted discharge by the Lower Colorado River RWQCB is 40,000 gallons per day. Leachate production is expected to be extremely low, and the treatment plant capacity adequate.

Project Sequencing

Neither refuse nor the liner will be placed at a level at or below the highest historically known groundwater level. The lowest point in the present East Pit excavation is at an elevation of approximately 705 feet above MSL. The projected sequencing plan for the landfill avoids disposal in the deepest part of the East Pit for approximately 85 years. Prior to initiating operations in this part of the pit, the bottom of the pit will be raised by filling this area with overburden material to an elevation at least 50 feet higher than the highest historically known groundwater level or to an elevation approved by permitting agencies.

Drainage

Temporary and permanent drainage facilities would be constructed to divert storm water flows around and away from the refuse fill, to collect and remove any storm water that falls on the refuse fill, to control off-site flow of waterborne debris, and to minimize erosion (Figure 27).

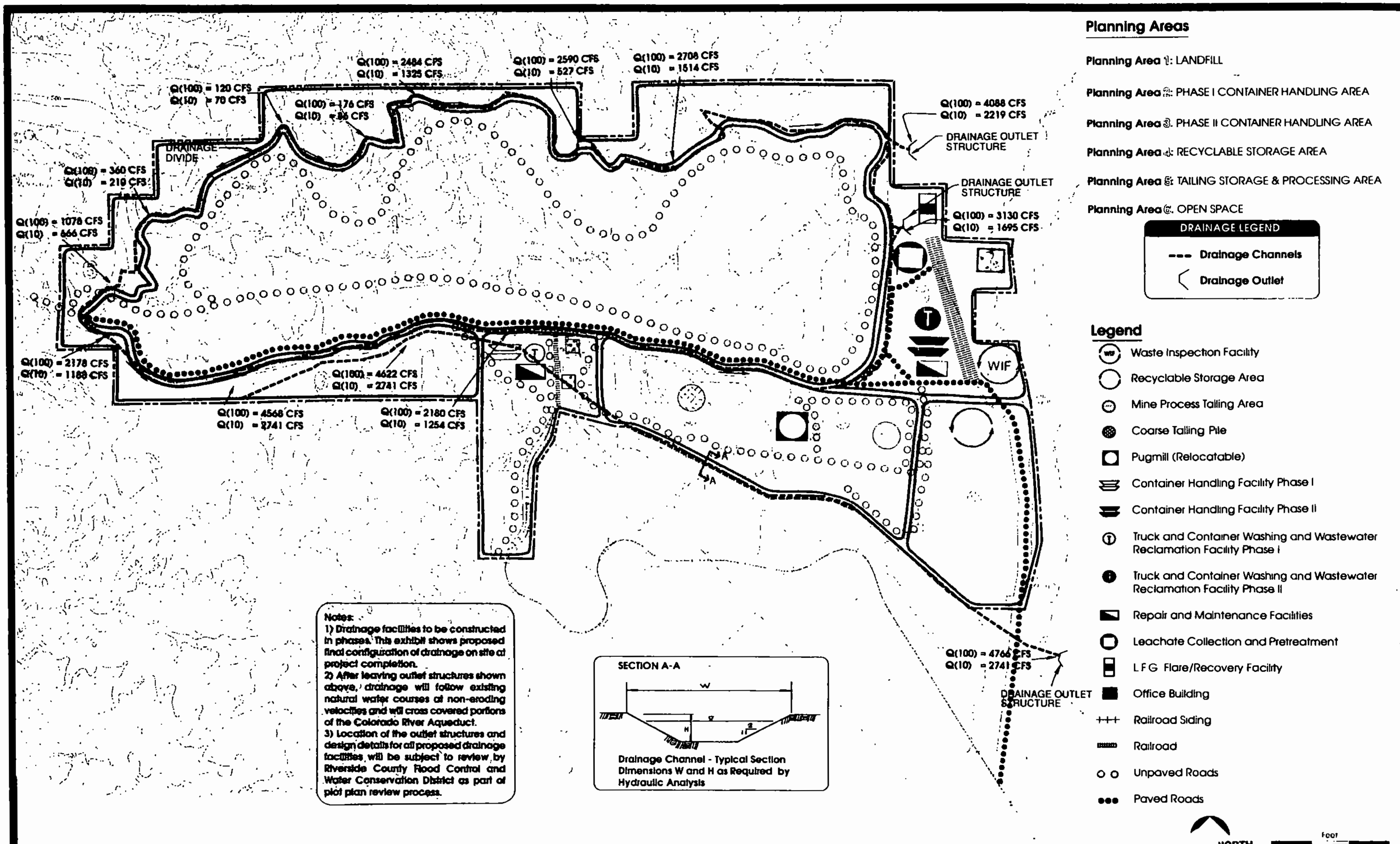


FIGURE 27. DRAINAGE PLAN

SOURCE: THE PRA GROUP, INC., 1991

Temporary drainage flows will also be diverted so as not to impact the Colorado River Aqueduct.

The proposed landfill would be designed to meet all relevant regulations. The state (Title 14 of the CCR) and federal (Resource Conservation and Recovery Act, Subtitle D, the "open dump" criteria) regulations require that the landfill be protected from flooding or washout from a 100-year, 24-hour duration storm. Further, Title 23, CCR, Chapter 15, regulations require a minimum final slope to facilitate drainage and hence minimize infiltration of water into the landfill and subsequent potential degradation of groundwater quality.

As the site filling progresses, interim drainage control measures shall be utilized to prevent runoff from reaching areas of waste deposition or active fill areas. This drainage would be directed around the landfill for discharge to the alluvial areas to the east. From all discharge locations, runoff will proceed via sheet flow over covered portions of the Colorado River Aqueduct. Temporary drainage structures will be constructed around initial fill areas to prevent storm runoff from entering the active area of the landfill. The drainage will be routed around the active area and in some cases may flow into the east end of the East Pit, where it will be allowed to evaporate. Temporary drainage will be conveyed to the East Pit in order to intercept runoff from final drainage structures which has not been already intercepted, and keep it from entering initial fill areas. Landfill activities will not be undertaken in this area for approximately 85 years. If runoff comes in contact with refuse, it will be considered leachate and pumped from the pit to the wastewater pretreatment facility on the site where it will be treated. These interim measures shall be incorporated into the site operational plan and subject to review by the regulatory oversight via the state's periodic review process. The final landfill slope shall meet the Chapter 15 minimum of three percent.

Elements of the system to be constructed initially include a drainage system for the container handling area and permanent drains near the eastern extent of the refuse disposal area, as well as a series of downdrains. The interim drainage system will consist of a series of intersecting channels and settling/detention basins. These features will be replaced as the refuse operations continue to final elevations.

Upstream drainage would be conveyed past the landfill and town areas where it can be safely discharged into the natural flow paths downstream. The drainage plan would provide two landfill perimeter drains and an improved system through the town. The southern toe of the landfill is designed outside of and above the 100-year floodplain limits. The northern perimeter drain would collect flows from the landfill surface and northern canyons tributary to the landfill toe. The southern perimeter drain would collect flows from the landfill surface only. Both landfill drains would discharge east of the site at noneroding velocities.

Upon completion of the landfill, the northern perimeter drain would be approximately 16,500 feet long, and the southern perimeter drain would be approximately 18,500 feet long. The drain channel bottom width would be 20 feet and the top width would vary from 26 to 40 feet (see inset on Figure 27). The depth of flow in the channel would range from less than one foot to approximately four feet. Both drain channels would be sized to contain runoff from a 100-year rainfall frequency event, plus a two-foot freeboard allowance (see the drainage section and Appendix B of this draft EIS/EIR for more details).

Storm water that falls directly on areas which have been filled with covered refuse, that is, unpolluted surface flows, will be collected in a series of surface drains and conveyed to one of the storm water drainage systems described above. Storm water which comes into contact with refuse will be considered leachate and will be collected, pumped, and transported to the leachate/wastewater pretreatment plant.

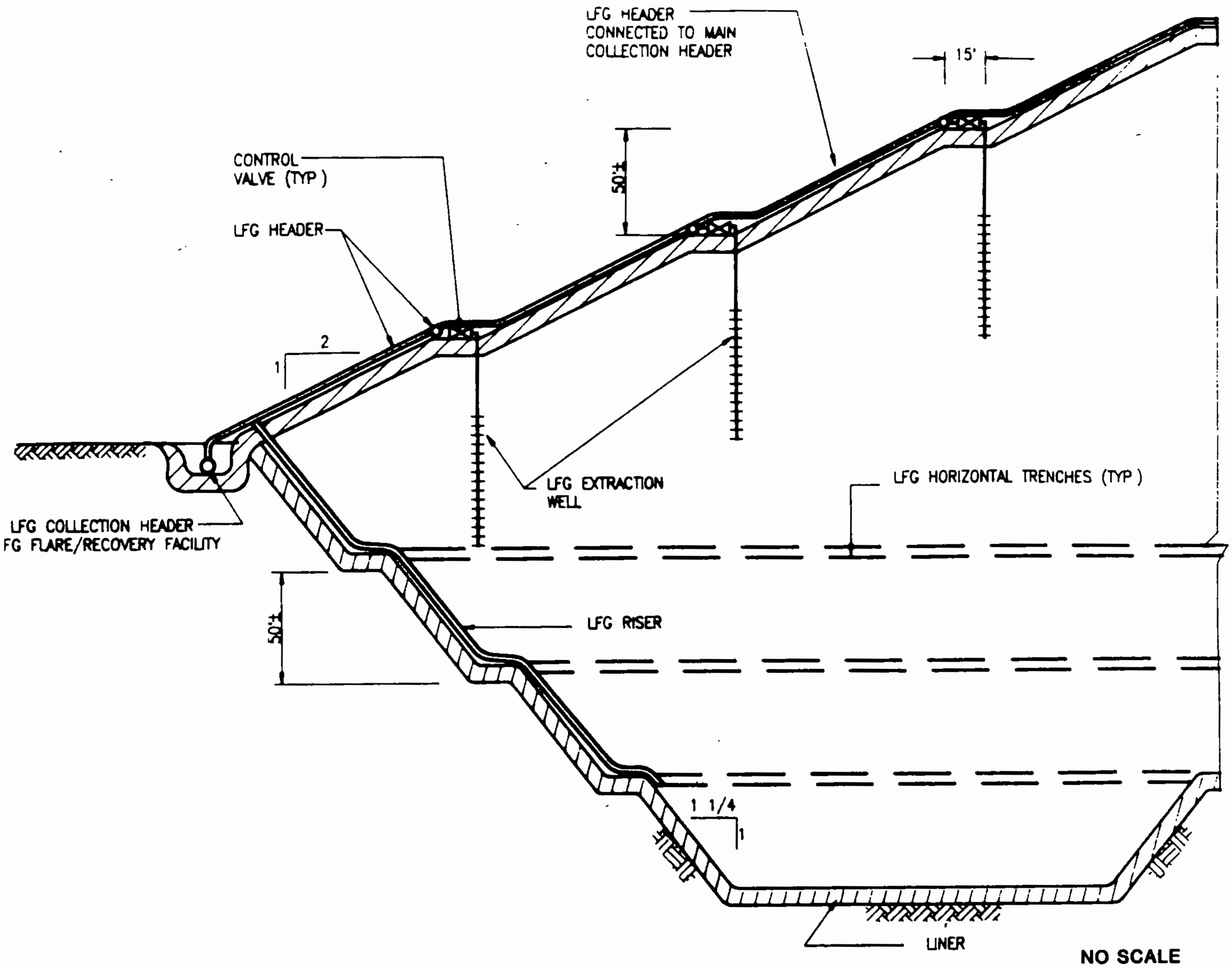
Runoff from the container handling yard will be contained by berming this area. Flows will be conveyed through a gravity interceptor to natural watercourses east of the project site. Gravity flow through the interceptor will remove floating grease and oil and solids from the runoff.

Gas Control

The landfill gas emission and migration control system will consist of a grid of horizontal collection pipes laid in trenches in the refuse and/or vertical extraction wells. The horizontal collection system would be installed as cells were constructed and final elevations achieved, while vertical extraction wells are constructed on the benches and the highest elevations of the landfill to control LFG emissions. The vertical and horizontal extraction wells will be connected to headers (i.e., collection pipes), which in turn will be connected to the LFG emission control/utilization system.

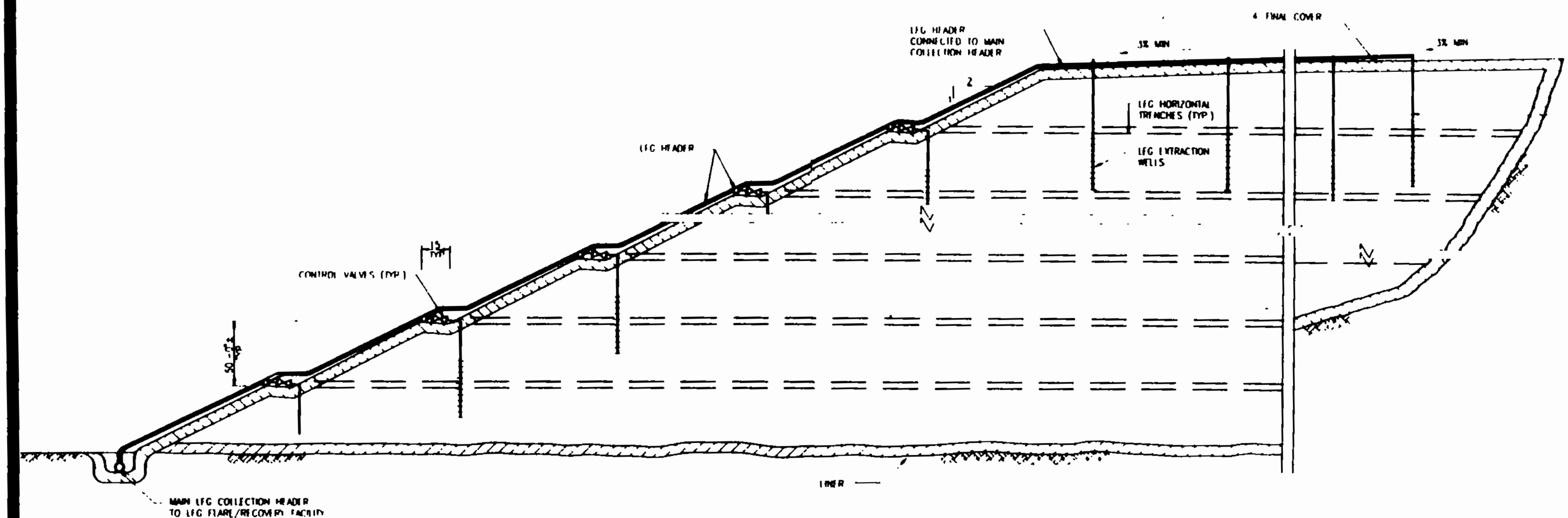
Initially, LFG would be incinerated in a thermal combustor consistent with state requirements and South Coast Air Quality Management District (SCAQMD) regulations. A supplemental fuel-fired burner may be used when the methane content of the LFG is too low to utilize the thermal combustor system. When emissions reach 80 percent of the threshold value of New Source Review, or sooner if economically viable, the thermal combustors would be replaced with an energy recovery system providing emission control and an alternate energy source.

Construction of the thermal combustor station would begin within one or two years following the start of landfilling operations. The proposed final combustor/energy recovery facility is located in Planning Area 3 shown on Figure 16. Temporary units may be utilized near the source of the LFG in Planning Area 1. Design specifications of the flares (stack height, diameter) have not been determined by the applicant. In accordance with current SCAQMD guidelines, the flares are expected to operate at a minimum temperature of 1,400 degrees F and a residence time of 0.3 second. Figures 28 and 29 show a typical sectional view of the LFG emission and migration control system in the east pit area and the west fill area. The LFG control system will also consist of a series of gas migration probes placed around the perimeter



SOURCE: SCS ENGINEERS,

FIGURE 28. LANDFILL GAS COLLECTION SYSTEM IN THE EAST PIT AREA



TYPICAL SECTION
NOT TO SCALE

SOURCE: SCS ENGINEERS,

FIGURE 29. LANDFILL GAS COLLECTION SYSTEM IN THE WEST FILL AREA

of the site to detect any off-site gas migration. Probe spacing and depth will conform with SCAQMD and CIWMB guidelines.

LFG condensate will be collected in traps placed at low points along the gas collection system. The traps will be enclosed in double-walled underground tanks. Truck-mounted pumps will periodically remove the condensate and carry it either to the wastewater pretreatment facility or to storage pending disposal off-site at a licensed hazardous waste disposal facility depending upon the condensate composition.

Assuming that 80 percent of the generated LFG can be recovered for energy purposes, gas recovery operations will likely be initiated within 8 to 17 years when the amount recovered is predicted to exceed 10 million cubic feet per day (mmcfd).

Final Cover

As final grades are reached in the landfill areas, a final cover with a minimum thickness of four feet would be emplaced. As specified in Title 23, CCR, Chapter 15, the cover would consist of:

1) A two-foot foundation layer applied over the last cells of refuse disposed in the landfill,

2) A minimum one-foot-thick barrier layer with an effective permeability of at least 1×10^{-6} centimeters per second, compacted to 90 percent relative density, and

3) A vegetative layer of one foot minimum thickness as specified by Title 23, CCR, Chapter 15. A "vegetative" layer is a layer of earth amended with compost or humus and fertilizers such that it will support vegetative growth. The purpose of this is to allow natural vegetation to take hold on the landfill cover to provide erosion control.

The upper surface of the landfill would have a minimum 3 percent gradient to provide adequate drainage and limit the potential for ponding and erosion on its surface.

d. Closure and Post-Closure

The California Integrated Waste Management Board, Riverside County Department of Health, and Regional Water Quality Control Board have requirements regarding closure and maintenance of landfills. The closure plan would include continuing groundwater monitoring, gas collection and control, and continued landscaping and other maintenance work. The financial capacity to certify the availability of funds for monitoring and maintenance for 30 years after the closure of the landfill must also be demonstrated.

The currently determined post-closure use of the site would be to return the site to a natural desert condition. Settlement and the presence of gas collection facilities limit the types of uses that can be developed after closure. Post-closure uses of the landfill site will be compatible with adjoining uses (e.g., Joshua Tree National Monument).

B. Reduced Landfill Operations Alternative

Within the general scope of the proposed project, a variety of different configurations for the landfill are possible. Besides the particular phasing and ultimate configuration that is proposed, a project scope which provides for a reduced level of operations and configuration of landfill contours is considered in this document.

The reduced operations alternative would allow for the disposal of up to 16,000 tpd, including up to 14,000 tpd by rail and up to 2,000 tpd by truck. Truck traffic is included in this alternative to enable the project to serve potential future demand in Riverside County which cannot be served economically by rail transportation. This alternative would have the effect of reducing the total capacity of the landfill by approximately 20 percent compared with the proposed action. However, at an inflow of 16,000 tpd, the potential 115-year site life of the project would not be reduced under this alternative.

The landfill footprint would be reduced to include only the area shown in Sequence III of the project (see Figure 20). In reducing the area of the landfill footprint, development would not occur in portions of the East Pit which contain mineral resources or water. The final elevations of this alternative would be slightly less than with the proposed action. The maximum elevation of this alternative is 2,200 feet MSL.

The alternative is consistent with the proposed action's phasing plan as related to the construction of drainage, leachate, landfill gas, liner, haul roads, and other aspects of the proposed landfill design.

The landfill operations would be similar to those described in the proposed action. The waste would be initially received at transfer stations in the counties of Los Angeles, San Bernardino, Orange, and Riverside. After sorting and compaction it would be shipped via rail and truck to the landfill site where it would be deposited. Potential leachate production would be controlled, monitored, and treated. Groundwater would be monitored. Drainage around the landfill would be provided. Landfill gas would be collected and controlled. This proposed alternative would observe all of the appropriate requirements of a Class III landfill, including closure and post-closure. Mining exploration, mining, and related ore processing would be much less affected with this alternative.

C. Proposed Action with Rail Access Only Alternative

This alternative would reduce the daily capacity of the project to 16,000 tons, all of which would be delivered by rail. This alternative would eliminate the use of refuse hauling trucks to the proposed site; however, all other landfill activities described in the proposed action would remain the same. While this alternative may be technically and economically feasible, it precludes transporting waste from nearby sources in Riverside County. Serving Riverside County is an important condition of locating the project in Riverside County. In addition, this alternative would reduce the project's operational flexibility.

D. No Action Alternative

This alternative would leave the Eagle Mountain site in its present condition and no landfill would occur. The caretaker status of the former mining operations would be maintained, at least temporarily. The existing mining reclamation plan (Kaiser Steel Corporation 1978) may be implemented. The East Pit and surrounding piles of overburden rock and mine tailing would remain, with minor drainage and other improvements to stabilize their surfaces and allow natural revegetation to occur. The land surrounding the former mining operations would continue to be highly disturbed. The economic benefits to the county and the Desert Center economy resulting from the landfill operations would not occur.

Under the No Action alternative, the BLM/Kaiser land exchange could still occur in the future, although that is highly unlikely without the proposed landfill operations. The railroad right-of-way grant would not be necessary under this alternative.

Metropolitan southern California communities would continue to rely on existing, expanded, or new landfills under the No Action alternative. Even with state-mandated solid waste reduction goals, the existing capacity in most landfills is limited to a decade or less (SCAG 1988).

E. Features Common to All On-Site Alternatives

The on-site alternatives may be divided into two groups. Three alternatives involve filling the Eagle Mountain iron ore open pit mine with municipal solid waste and one proposes not to fill the mine with solid waste. For all of the alternatives involving landfilling at Eagle Mountain (the proposed action, reduced landfill operations alternative, and proposed action with rail access only alternative), many operations and features would be identical. These include the operation of the container handling yard, transport of containers to the working face of the landfill, deposition and compaction, leachate and gas control systems, final cover, and closure activities. In addition, the discretionary actions necessary for these alternatives would be identical or quite similar. Except as noted in their descriptions, the overall impacts of these alternatives would be very similar. All of these alternatives would depend on the future establishment of processing and transfer stations elsewhere in the metropolitan southern California communities which would sort solid waste to remove unacceptable material and recyclable material. These processing and transfer stations would require their own local and state discretionary approvals and accompanying environmental review.

F. Summary of Environmental Impacts–Comparison of On-Site Alternatives

Table S-2 presents an overall summary of the relative effects of the various on- site alternatives when compared with the proposed action. Because the precise effects would depend on details of each alternative and the extent to which environmental mitigation measures could be incorporated into each alternative, this comparison is approximate. The overall comparison may be summarized as follows:

1. Reduced Landfill Operations Alternative

This alternative reduces the maximum tonnage per day of waste brought to the landfill by 20 percent. It also reduces the size of the final footprint of the landfill and the final elevation of the landfill. As a result, incremental reductions in nearly all of the potential impacts resulting from the proposed action would be realized. However, air quality impacts, though reduced, would still remain significant and not fully mitigated. The disadvantages of this alternative do not relate to impacts within the project site and are, therefore, not reflected in the comparison table.

2. Proposed Action with Rail Access Only Alternative

This alternative would result in impacts generally identical with the proposed action. Those impacts related directly to truck operations—air emissions, potential conflict with other vehicle traffic, and noise—would be eliminated. The ability to respond to rail accidents by shifting delivery mode to trucks might be slightly impaired under this alternative.

3. No Action Alternative

With respect to potential environmental impacts in the project site and immediate vicinity, the No Action alternative may be better in nearly all respects than the proposed action. Depending on the continuance of uses within the Eagle Mountain community, the potential land use and economic impacts of this alternative may be adverse. Because of the existing contrast between the lighter-colored cut slopes and overburden piles around the East Pit when viewed against the darker ridgelines forming their backdrop, this alternative would leave the noticeable visual impacts caused by the mining for an indefinite amount of time.

A major disadvantage of this alternative relates to impacts of landfills elsewhere and is not reflected in the table.

G. Analysis of Alternative Sites

1. Introduction

The above project alternatives are assessed throughout this document to satisfy the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). CEQA also requires an analysis of alternative sites in situations where requiring such an analysis is reasonable. Numerous alternative sites are evaluated below to meet this CEQA requirement.

The proposed action would ultimately involve the transportation of waste processed through material recovery facilities in urban areas to a remote desert site. This section of the report compares the impact profile of the proposed action with impacts associated with other potential rail haul projects which would require the same type of network of centrally located MRFs from which to transport waste by rail to remote project sites.

The demand served by the proposed action could also be satisfied if the waste is disposed of in facilities and counties where it is generated. Therefore, this section also compares the project impacts with proposed landfill projects in counties where the waste would be generated.

2. Alternative Site Analysis

a. Remote Rail Haul Projects

Remote Desert Site Rail Haul Projects

In 1988, the Southern California Association of Governments prepared a feasibility study and a general environmental assessment of transporting waste by rail to nine remote desert sites, including Eagle Mountain. The general locations of these projects are shown in Figure 30 and are listed below:

1) The Morongo Indian Reservation in Riverside County, 91 miles from downtown Los Angeles.

2) The City of Blythe, approximately 230 miles from downtown Los Angeles.

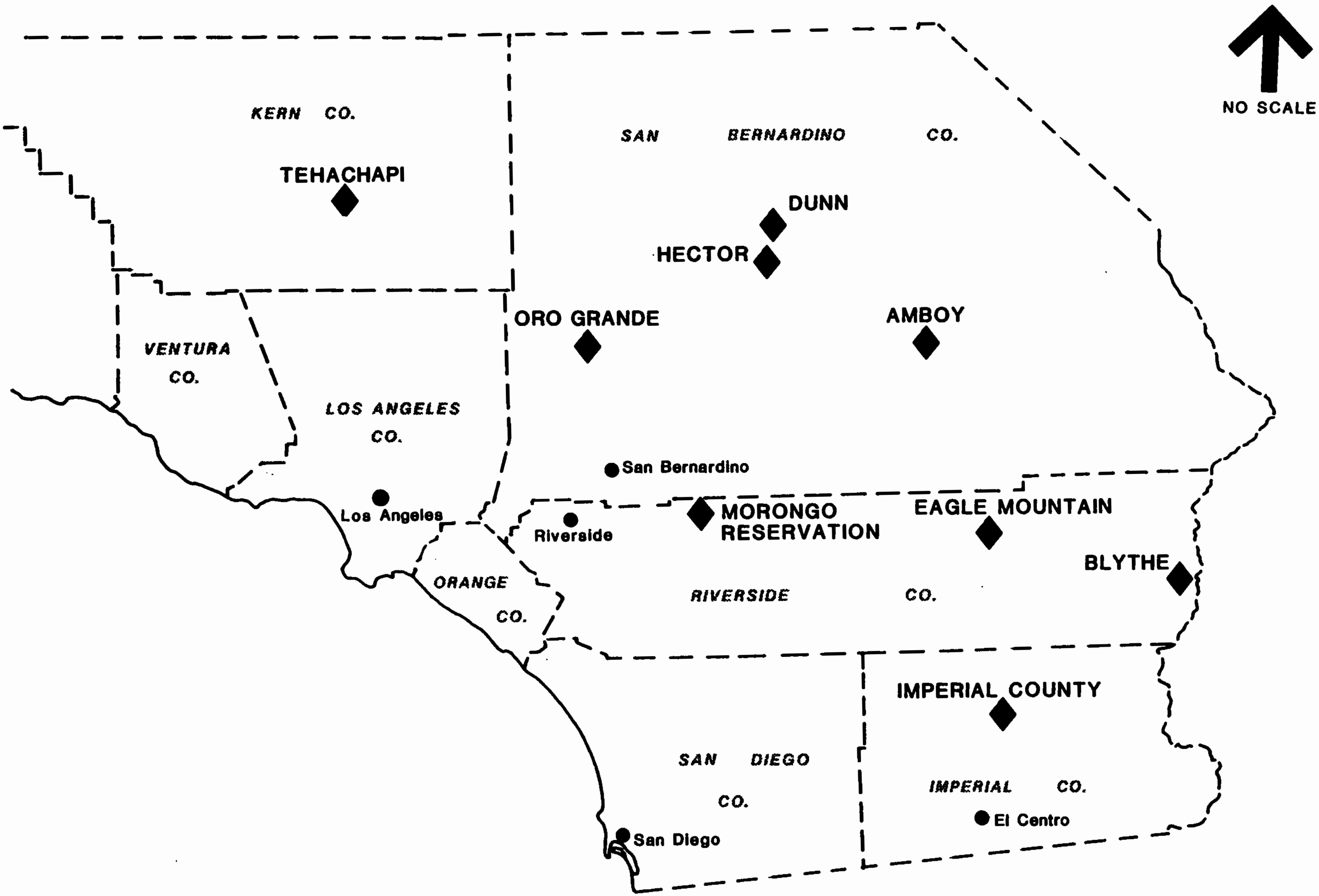


FIGURE 30. ALTERNATIVE DESERT DISPOSAL SITES

RECON

3) Niland in Imperial County, 197 miles from downtown Los Angeles.

4) A solid waste gasification plant proposed in Oro Grande, in San Bernardino County, 113 miles from downtown Los Angeles.

5) An alternative gasification project proposed at Dunn, also in San Bernardino County, 184 miles from downtown Los Angeles.

6) A disposal site 10 miles north of Hector in San Bernardino County, 186 miles from downtown Los Angeles.

7) A site near Amboy in San Bernardino County, approximately 220 miles from downtown Los Angeles.

8) A site near Tehachapi in Kern County, approximately 122 miles from downtown Los Angeles.

Although private parties have expressed an interest in developing all of the above, permit applications have only been filed for two projects. An application was filed in 1989 known as the Hidden Valley site to develop the site north of Hector as a hazardous waste residuals repository. However, the Eagle Mountain project involves Class III nonhazardous solid waste, not hazardous waste; thus, the Hector site is not comparable. An application for a Conditional Use Permit and General Plan Amendment were filed for the Amboy Class III landfill project in August, 1990. Project descriptions are not available for the other projects. For some of these projects, specific sites have not even been identified. In addition, combustion technologies and operating parameters have not been defined for the gasification projects. A discussion of the alternative follows under Section G.2.a.

Generically, all of the above projects would involve waste processing through a system of processing and transfer stations/materials recovery facilities similar to those to be used in conjunction with the Eagle Mountain project. Landfills located in the above locations would be subject to regulatory requirements similar to those of the Eagle Mountain project. Accordingly, a number of impacts from landfill operations would be similar at each site:

1) Public safety impacts related to the potential for hazardous materials in the waste stream, vectors, landfill fires, accidents, and worker safety would be essentially the same as those anticipated for the project. The same types of mitigation measures would also be appropriate.

2) Stationary source emissions from landfill gas combustors and energy recovery facilities would be of the same order of magnitude and significance as for the Eagle Mountain

project. These impacts would occur outside of the South Coast Air Basin. Similar, if not identical, regulatory controls would apply to these projects.

3) Dust and air emissions from landfill equipment would be the same order of magnitude and subject to the same types of mitigation measures as the project.

4) In remote areas, these projects would generate comparable levels of new population and employment.

Vehicular impacts (i.e., mobile air emissions, noise and energy consumption for trains and trucks) would vary in terms of distance between these sites and the areas where waste is generated, the proximity of residential areas to rail rights-of-way, and the volume of traffic at nonseparated grade crossings. In terms of these indices, the SCAG report indicates the following:

1) Because of distance, the development of projects at Blythe and Eagle Mountain ranks highest in terms of fuel consumption and air emissions from waste transport.

2) From downtown or east Los Angeles, rail transport to Niland and Eagle Mountain would result in the greatest number of hours of vehicle delays at nonseparated grade crossings. From the city of Industry, vehicular delay is much greater for transport to Tehachapi than for transport to any other site. From Irwindale, projects in Tehachapi, Oro Grande, Blythe, and Amboy would result in the greatest vehicular delay.

3) From downtown Los Angeles, the greatest population exposure (estimated population within 1,000 feet of rail lines) would occur in conjunction with projects in Tehachapi, Niland, and Eagle Mountain. From the city of Industry, the greatest exposure would occur with sites in Tehachapi, Dunn, and Hector. From Irwindale, the greatest exposure would occur with the sites at Tehachapi, Niland, and Eagle Mountain. Potential noise and vibration impacts would vary in terms of population exposure; these impacts are not considered significant as related to the Eagle Mountain project.

Air emissions from rail transport and the lack of feasible mitigation measures are the major reasons that air quality is considered a significant adverse impact of the proposed action. Based on the analyses contained in the air quality technical report, all of the project alternatives—including continued use of in-basin landfills at existing, expanded, and new locations—are considered to have a significant effect on air quality. The alternative of continued use of in-basin landfills would have the lowest air quality impacts overall, due to the fact that the transportation distances are shortest. However, in-basin solid waste decomposition emissions may be substantially higher than for disposal in arid out-of-basin locations, including Eagle Mountain. The remote siting alternatives would result in air quality benefits in the South Coast Air Basin for ozone, carbon monoxide, and particulate matter, at the expense of increased impacts in desert areas. The improvements in South Coast Air Basin would pass through to the desert areas over the San Gorgonio Pass; however, these benefits would not be sufficient to outweigh the direct adverse impacts in the desert.

Differences among these projects are likely to occur in terms of site-specific factors such as groundwater, biological and cultural resources, soils and geology, and the availability of public services and utilities. Without a clear identification of project boundaries, it is not possible to provide a meaningful evaluation of these impacts compared with those related to the Eagle Mountain project.

Amboy (Bolo Station Landfill) Railcycle Project

Permit applications for a Conditional Use Permit and General Plan Amendment were filed for this project in August, 1990, and a revised application in September, 1990. San Bernardino County issued a CEQA Initial Study for the project on December 27, 1990. The project will establish an intermodal rail unloading facility and a Class III nonhazardous solid waste landfill on a 4,800-acre site directly adjacent to the Bristol Dry Lake (Figures 31 and 32) and approximately six miles east of the undeveloped towns of Chambless and Cadiz. At full operations the project will serve approximately seven trains per day. Capacity is estimated at 685 million cubic yards. The landfill has an estimated site life of 66 to 100 years depending on daily inflow. Based on the Initial Study, potential impacts of the project are comparable to those associated with the Eagle Mountain project.

Project Setting. The site is adjacent to the Bristol Dry Lake (to the south and west). The terrain is generally flat, sloping gently to the south. Existing land use to the north and south is largely undeveloped. To the east lie the undeveloped towns of Chambless and Cadiz in addition to citrus farms in Cadiz. Leslie Salt and National Chloride Mining Operations lie to the west, as do the towns of Amboy (six miles to the west) and Saltus (approximately two miles to the west).

Project Impacts. Other than those impacts anticipated in conjunction with any landfill project (e.g., landfill fires, vectors, the presence of hazardous materials, landfill gas migration) and those impacts which cannot be assessed until a site near Amboy is identified (e.g., noise), the following impacts are likely at the Amboy site:

Geologic Hazards. The nearest known cataloged fault is over three miles from the Amboy site. The site is not identified in the County General Plan as being located within a Geologic Hazards Overlay. However, a February 1988 background report for the San Bernardino County General Plan identified the project site within or very near the generalized liquefaction area of Bristol Dry Lake and near the volcanic activity area of Amboy Crater. Additional geologic studies will be conducted for the EIS/EIR.

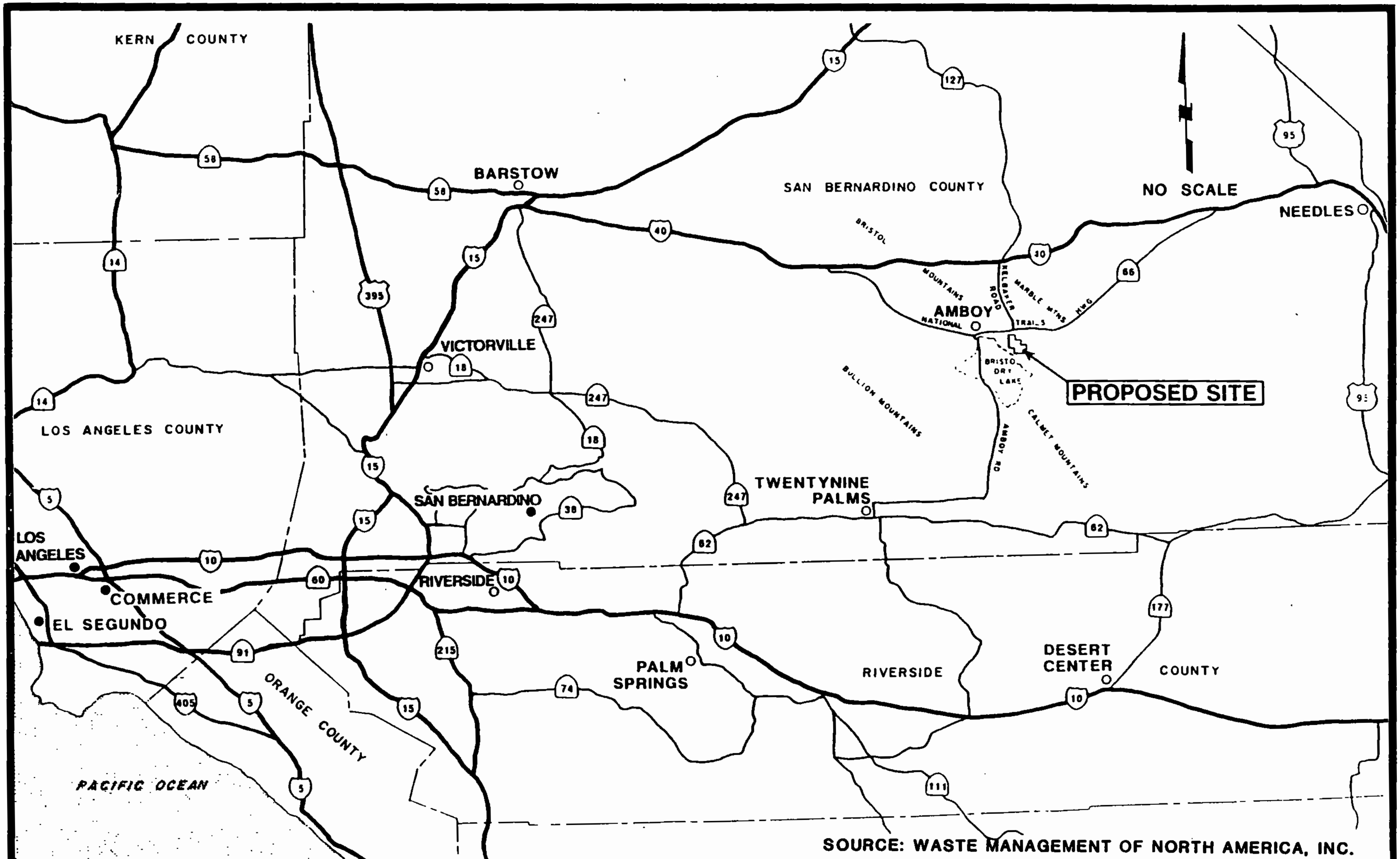


FIGURE 31. AMBOY DISPOSAL SITE LOCATION

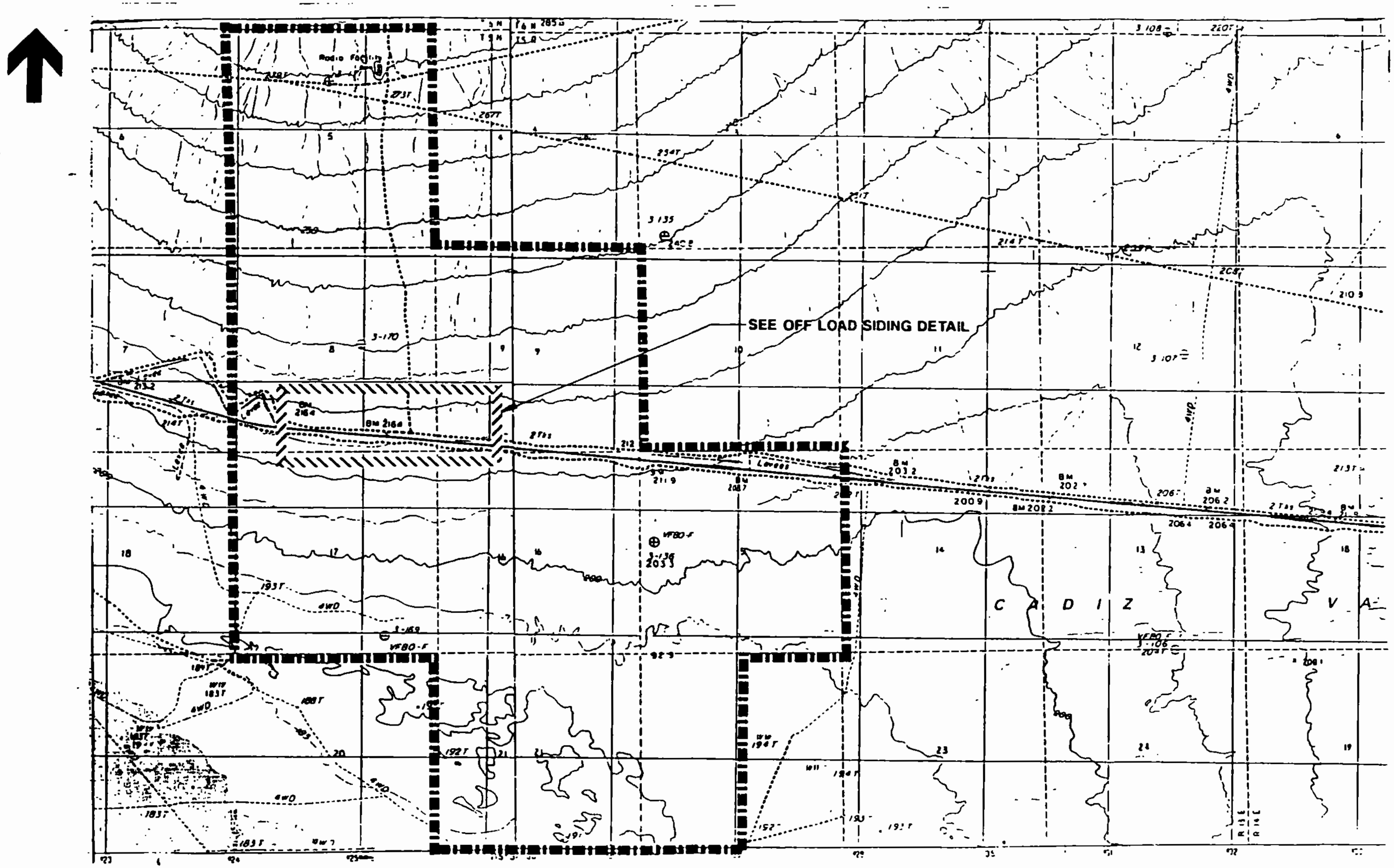


FIGURE 32. AMBOY DISPOSAL SITE

Flood Hazards. The Amboy project site is not within a Flood Hazard Overlay Zone of the San Bernardino County General Plan. The Amboy project will alter storm runoff and surface water flows in areas adjacent to the project (i.e., the dry lake bed). The significance of these issues will be assessed in the Amboy EIS/EIR.

Groundwater Quality. The Amboy project is in a hydrologically closed groundwater basin where the groundwater flows toward the Bristol Dry Lake playa. The depth to groundwater is estimated at about 300 feet at the northern end of the site and 50 feet at the southern end. The northeast and southwest corners of the site may lie within fresh and brine groundwater zones, respectively. Potable water is pumped from wells to the northeast, upgradient from the site. However, the extent of the groundwater basin is not known. Consequently, it is not known whether public water supplies are drawn from the basin or will be affected by the project. The Initial Study for the Amboy site indicates that potable water will be delivered to the site in railroad tank cars.

Biological Resources. The Amboy project is known to be located in desert tortoise habitat and could potentially impact that federally and state-listed threatened species. A full assessment of biological resource impacts will be provided in the Amboy EIS/EIR.

Cultural Resources. According to the Initial Study, the Amboy project is in an area which contains numerous prehistoric and historic archaeological resources. Because landfilling will result in substantial disturbance to previously undisturbed areas, this project may result in significant impacts. These issues will be addressed fully in the EIS/EIR.

Land Use. To develop the Amboy project, a General Plan Amendment and Conditional Use Permit would be required. Development of the landfill will introduce a new use into the area that can be considered a substantial alteration of the present and planned uses in the Amboy/Cadiz/Bristol Dry Lake area. The project site is within a Resource Conservation (RC) General Plan Official Land Use District, which is intended for open space and limited rural development in remote areas of the County; the maximum housing density in the RC district is one dwelling unit per 40 acres. The site is within an area designated Improvement Level 5 (II-5), that is, an area planned for little or no development in remote areas with severe environmental and physical constraints or lack of resources. The Amboy project involves currently undisturbed land and requires a relatively large mining operation to create a location and cover for the landfill.

Socioeconomic. The Initial Study for the Amboy project indicates that 134 persons will be employed at the landfill after the facility has operated for five years. In the event that there are no sufficient housing units in the vicinity of the project, the applicant proposes mobile housing for temporary use. Other communities in the vicinity of the Amboy site do not have sufficient housing opportunities.

Public Services/Utilities. The Amboy site is a considerable distance from the nearest fire station that could respond to an emergency. Accordingly, the applicant will be required to provide sufficient water and storage to meet fire flow requirements.

Visual/Aesthetics. The project site is in a low-lying basin with mountains to the north and south. The project will create a mound approximately 420 feet above existing ground level in a relatively flat basin area which will be highly visible in all directions (i.e., from the National Trails Highway, the town of Amboy, and surrounding mountains). A full visual assessment will be conducted in the Amboy EIR/EIS.

Mineral Resources. The Amboy site is adjacent to extractive mining operations. The Initial Study for the Amboy project indicates that the project may have an impact on the potential to extract minerals, by limiting access to mineral resource areas near the site.

Air Quality. Using the same criteria of significance for Amboy as Eagle Mountain as described in the Air Quality section of this draft EIS/EIR, rail haul to the Amboy area would also result in a significant environmental impact. Proportionally, this project would result in the same level of emissions within and outside of the South Coast Air Basin.

Amboy Project Compared with Eagle Mountain Project. At full operations, the Eagle Mountain landfill project will serve up to six trains per day. Capacity is estimated at over 100 billion cubic yards. The landfill has an estimated site life of 115 years, much greater than that of Amboy. Compared with the Eagle Mountain project, a project at Amboy would be expected to have a smaller volume of material delivered by truck; a total of 500 tons per day of truck-hauled waste is proposed, as compared with the 4,000 tons per day expected with the Eagle Mountain project. This is due to the fact that only Barstow is located within the 100-mile radius in which truck hauling is expected to be economic. The following discussion highlights the similarities and differences between the Amboy and Eagle Mountain landfill projects.

There are no known significant geologic hazards associated with the Eagle Mountain project, to which the nearest active fault is three to four miles to the north in the Pinto Basin. At Eagle Mountain, depth to groundwater is between 350 and 400 feet at the western end of the East Pit and as much as 800 feet at the western end of the project site, but less elsewhere on the site. The general groundwater flow pattern is to the east-southeast. Both projects incorporate the same types of protective measures (e.g., liners, leachate collection systems) to minimize potential impacts.

The Eagle Mountain project will result in potentially significant impacts on bighorn sheep, desert tortoises, and a number of other species, all of which are mitigated below a level of significance. It is anticipated that mitigation for biology impacts for the Amboy project will involve many of the same mitigation measures identified in the Eagle Mountain landfill draft EIS/EIR.

Both projects will require existing General Plan amendments.

Although dwelling units in the town of Eagle Mountain will have to be upgraded, the existing housing stock is sufficient to house the labor force at the landfill. Infrastructure (sewer, water, schools, and other utilities) is currently available in the town of Eagle Mountain.

For the Eagle Mountain project, the impact on mineral resources is also a concern. The phasing plan for the landfill will ensure that areas with economically recoverable mineral deposits will not be landfilled for a period of approximately 85 years. If prior to that time it becomes economically feasible to undertake mining, a supplemental environmental document will be prepared to assess the impacts of recovering iron ore at Eagle Mountain.

The visual impact assessment for the Eagle Mountain project showed no significant visual impact.

With approximately the same inflow as the Eagle Mountain project, it is assumed that stationary source emissions and emissions from landfill equipment would be roughly the same or slightly less at Amboy than at Eagle Mountain. Moreover, depending on what routes are used for trains serving Amboy, rail emissions may be slightly less for Amboy than for the proposed Eagle Mountain project.

It is assumed that with the exception of air quality, mitigation measures similar to those recommended for the Eagle Mountain project which would reduce impacts to levels of insignificance would be necessary and approved in conjunction with the Amboy project.

b. Proposed Landfills/Expansion of Existing Landfills in Counties Where Waste Is Generated

An issue of concern expressed in response to the Notice of Preparation was that waste generated outside Riverside County not be accepted in conjunction with the Eagle Mountain project. Because of the potential life span of the Eagle Mountain project and the impending shortage of disposal capacity in the counties to be served by the project (see Section I.A.), the primary effect of not accepting imported waste at Eagle Mountain would be to increase reliance on efforts to site new facilities or to expand existing facilities in other counties in southern California.

The impacts associated with developing new sites or expanding existing sites that would serve the same market areas as the proposed action are shown in Table 3. Potential sites and market areas include:

1) Elsmere and Sunshine canyons potentially serving the city of Los Angeles and other parts of the northwestern Los Angeles County.

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
Geology	Surficial material in the area consists of stream terrace deposits composed of sands, silts, and gravels. These sediments are underlain by marine sandstones, siltstones, and conglomerates of the Pliocene Fernando and Miocene Puente formations. Basement material consists of mesozoic granite intrusives and low-grade metamorphic rocks.	Site underlain by Pico and Towsley Formations. Permeability rated good. Core tests have indicated low permeability at the project site.	Site underlain by siltstones, claystones, and silty sandstones of the Pico Formation. Permeability rated good. Bedrock moderately fractured; most fractures closed and tight.	The area consists primarily of igneous and metamorphic bedrock exposed in canyon walls. Quaternary alluvium consisting of sands, silts, and gravels is exposed in canyon bottoms. The bedrock type found at the site has a low permeability rating.	The area consists of igneous and metamorphic bedrock exposed in the canyon walls. Surface alluvium is exposed in canyon bottoms and upper canyon slopes. The most numerous exposures of bedrock are at the base of canyon; upper canyon contains substantial cover of alluvial materials. The bedrock type found at the site has a low permeability rating.	Lithology in vicinity of site consists of upper Jurassic and Palocene marine sedimentary deposits. Basement not exposed but thought to consist of granite. Thin deposits of alluvium found in canyon bottoms A number of clay and gravel pits are present in surrounding area. The bedrock type found at the site has a relatively low permeability rating.
Seismicity	The Whittier Fault Zone is located to the south within 2 miles of the landfill. This zone includes several historically active northwest-trending faults including the Whittier Narrows Fault which experienced a 6.0 magnitude	The inactive Whitney Fault is found on the site. Its location relative to the proposed landfill footprint is unknown. Faults from the Elsmere oil field also cross the site. The active San Fernando fault is about 1.5 miles from the	The potentially active Santa Susana fault in within 1 mi. of the site. Another inactive east-west fault is found on the northern part of site The active San Fernando fault is within 4 miles of the site.	Active faults in the vicinity of the site include the San Andreas Rift Zone 4 miles north, the Lytle Creek Fault 1.5 miles east, and the Cucamonga fault 0.75 mile to the south. Although close to active faults, the site is not known to	San Andreas Rift Zone (active fault) located approximately 1.2 miles southwest. Cleghorn fault (also active) may underlie portions of the site.	The seismically active Elsinore Fault Zone is located 1 to 2 miles southwest. This zone includes several active northwest-trending strike-slip faults.

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES
(continued)

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
	quake in Oct. 1988.	site. The active San Fernando fault is 4 miles from the site.		be situated on a Holocene fault.		
Air Quality	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization same order of magnitude or slightly less than Eagle Mountain. Project site impacts concentrated in South Coast Air Basin.	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization same order of magnitude of slightly less than Eagle Mountain. Project impacts concentrated in South Coast Air Basin.	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization same order of magnitude or slightly less than Eagle Mountain. Project impacts concentrated in South Coast Air Basin.	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization also less than proposed project. Project impacts concentrated in South Coast Air Basin.	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization also less than proposed project. Project impacts concentrated in South Coast Air Basin.	Mobile air emissions considerably less than for Eagle Mtn. project. Emissions from landfill equip. and LFG utilization also less than proposed project. Project impacts concentrated in South Coast Air Basin.
Ground Water	Elevation of ground water in vicinity of landfill is approximately 175 feet above MSL within the Gaspar Aquifer. However, elevations may vary considerably due to fluctuations in amt. of recharge at the Whittier Narrows Flood Control Basin.	Project site in vicinity of Santa Clarita Vly. ground water basin. At mouth of canyon, depth to ground water is app. 22 ft. Depth of canyon itself unknown. Monitoring is currently underway to characterize existing ground water quality	Exploratory borings have identified potentially limited ground water resources beneath site. Movement of shallow ground water assumed in direction of surface water. Extent unknown. Canyon previously used for oil recovery.	Although beneficially used ground water does not underlie the site, local areas of shallow ground water may occur as evidenced by springs in the surrounding area.	Ground water in the area anticipated to flow to south. Depth to ground water is variable due to poorly connected fracturing systems. Ground water quality is generally good.	Ground water quality in sedimentary rocks is anticipated to be low due to high levels of total dissolved solids; particularly likely in Jurassic rocks. Water in alluium expected to be better quality. Depth to ground water unknown but anticipated to be

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES
(continued)

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
	Ground water quality in Gaspar Aquifer considered poor. Regional ground water flow direction is generally to the southwest.	near the project site.				shallow in valleys filled with alluvium. Possible ground water recharge area immediately downstream.
Surface Water	San Gabriel River and Whittier Narrows Flood Control Basin are located to the northwest. Topography generally slopes to the northwest toward the Flood Control Basin.	Canyon drains to the north-northwest into the Newhall Creek and thereby to Santa Clara River.	Surface and ground water flows to the south. Flows prevented from entering Norman Reservoir. Water quality monitoring has not found evidence of contamination from existing landfill operations.	Site drains from north to south. Potential impacts to ground water basin beneath vly. floor.	Site drains from east to west to river with wells in river bottom Potential impact of surface flows to ground water basin beneath vly. floor.	General topography of the area slopes to the southwest and drains to Temescal Creek. Site is within large upstream area which is drained by Temescal Creek. Regional drainage pattern is to the northwest.
Biological Resources	If landfill expansion only increases elevation, biological resource impacts will be minimal. Depending on which new areas are proposed for devel. impacts will involve loss of southern riparian woodland, southern coastal sage scrub, cismontane-introduced	Site contains foothill oak woodland and chaparral. Presence of rare and/or endangered species unknown	Project will result in loss of vegetative habitat, primarily southern oak woodland coastal sage scrub. Project area serves as part of corridor for gene flow and species movement between San Gabriel and Santa Monica Mtns. via Simi Hills.	Presence of rare and/ or endangered plant & animal species unknown. Site assess. currently being conducted by San Bernardino County.	Presence of rare and/ or endangered plant & animal species unknown. Site assess. currently being conducted by San Bernardino County. Preliminary analysis indicated major biological problems with this site.	Site known to contain federally endangered SKR. Development cannot occur until HCP is approved.

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES
(continued)

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
	grassland, and some disturbed areas. Presence of rare and/or endangered animal species unknown.					
Noise	Residential uses and school lie immediately east of the site in Hacienda Heights. Landfill operations in new canyons may result in significant impacts.	Existing noise generators near site incl. Antelope Vly. and Sierra Hwys. Project will result in increased noise on surface streets near site. Proj. impacts not likely to be significant.	Preliminary draft EIR forecasts 0.3 dBA increase in ambient noise from project. This increase would be barely audible & not significant.	Because of location, ambient noise levels relatively low. Potential impacts not likely to be significant. Only potential receptor in vicinity of site is regional park to the east.	Because of location, ambient noise levels relatively low. Potential impacts not likely to be significant. No known sensitive receptors near site.	No known sensitive receptors in vicinity of site. Noise impacts not likely to be significant.
Traffic	Access from SR-60 at Crossroads Parkway adequate for existing and anticipated future traffic. Interchange provides direct access to site. Significant traffic impacts.	Traffic study currently being conducted as part of Program EIR for Countywide Solid Waste Mgmt Syst. Impacts not known at present. Cumulative impacts due to growth in City of Santa Clarita may significantly impact interchange capacity near site.	Preliminary draft EIR indicates increased volumes on San Fernando Road, although peak hour increases not considered significant.	No existing access to site. Devel. will require construction of access road & possib. new freeway interchange. Traffic conditions not congested in vicinity of site.	No existing access to site. Devel. will require construction of access road. Traffic conditions not congested in vicinity of site.	Lack of planned devel. in proximity to site may limit traffic impacts; to be evaluated in project-specific EIR.

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES
(continued)

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
Land Use	Residential uses & school lie east of site. Lots abut prop front face; trucks will be visible if devel. occurs in new canyons. Landfill equip. will be visible as cover is obtained to support increased elevation in existing disposal area.	Unincorporated lands near site designated for Hillside Mgmt. Portion owned by U.S. Forest Service. Dev. as landfill may conflict with Forest Service policy.	Site partially designated in County Plan for Hillside Mgmt. & Significant Ecological Area. Nearest devel. is trailer within 200 ft. of site & housing within 1/2 mile.	Devel. will require transfer from U.S. Forest Service. Adjacent & surrounding uses generally compatible. No encroachment of urban devel. near project site.	Devel. will require land transfer from U.S. Forest Service. Adjacent & surrounding uses generally compatible. No existing or planned urban devel. near proj. site.	Because site has not been specifically delineated, land use policy issues have not been identified.
Views/ Aesthetics	Residential & school uses abut the site. It may not be possib. to fully mitigate visual/aesthetic impacts of devel. in new areas.	Canyon interior generally shielded from view by existing ridgelines, although site visible from highways and devel. near site.	Views of upper elevations of landfill will be visible from portions of I-5 & at a distance from residential areas south east of site.	Limited, if any, visibility from uses in proximity to site. Front of landfill visible at distance from throughout San Bernardino Vly. Visible from I-15 at distance of about 1/2 mile.	Limited visibility from I-15. Accessible views from light traveled road north of site. Potential views of disposal vehicles on access road depending on alignment.	Lack of existing & planned residential uses in vicinity of site limits potential adverse visual impacts of project.

TABLE 3
COMPARISON OF ALTERNATIVE LANDFILL SITES
(continued)

Issue Area	Puente Hills	Elsmere Canyon	Sunshine Canyon	Duncan Canyon	Cleghorn Canyon	El Sobrante
Public Safety	Devel. will result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires, etc.	Devel. will result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires, etc.	Devel. wil result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires, etc.	Devel. will result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires.	Devel. will result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires.	Devel. will result in impacts related to presence of hazardous materials in solid waste, vectors, surface & subsurface fires.
Other	Previous EIR identified potential paleontological & archaeological impacts & mitigation measures. New devel. may result in the same impacts.	Numerour invertebrate species identified in canyon. These resources potentially significant. Site over old oil field; may be subject to seepage. Devel. may require provision of services & utilities.	Preliminary draft EIR does not identify other potentially significant impacts related to project.	Relative isolation of site may result in need to provide public services and utilities.	Relative isolation of site may result in need to provide public services and utilities.	Based on available data other issues have not been identified.

2) Puente Hills Landfill serving the San Gabriel Valley in Los Angeles County.

3) Duncan and Cleghorn canyons serving the valley area in San Bernardino County.

4) El Sobrante Landfill serving western Riverside County.

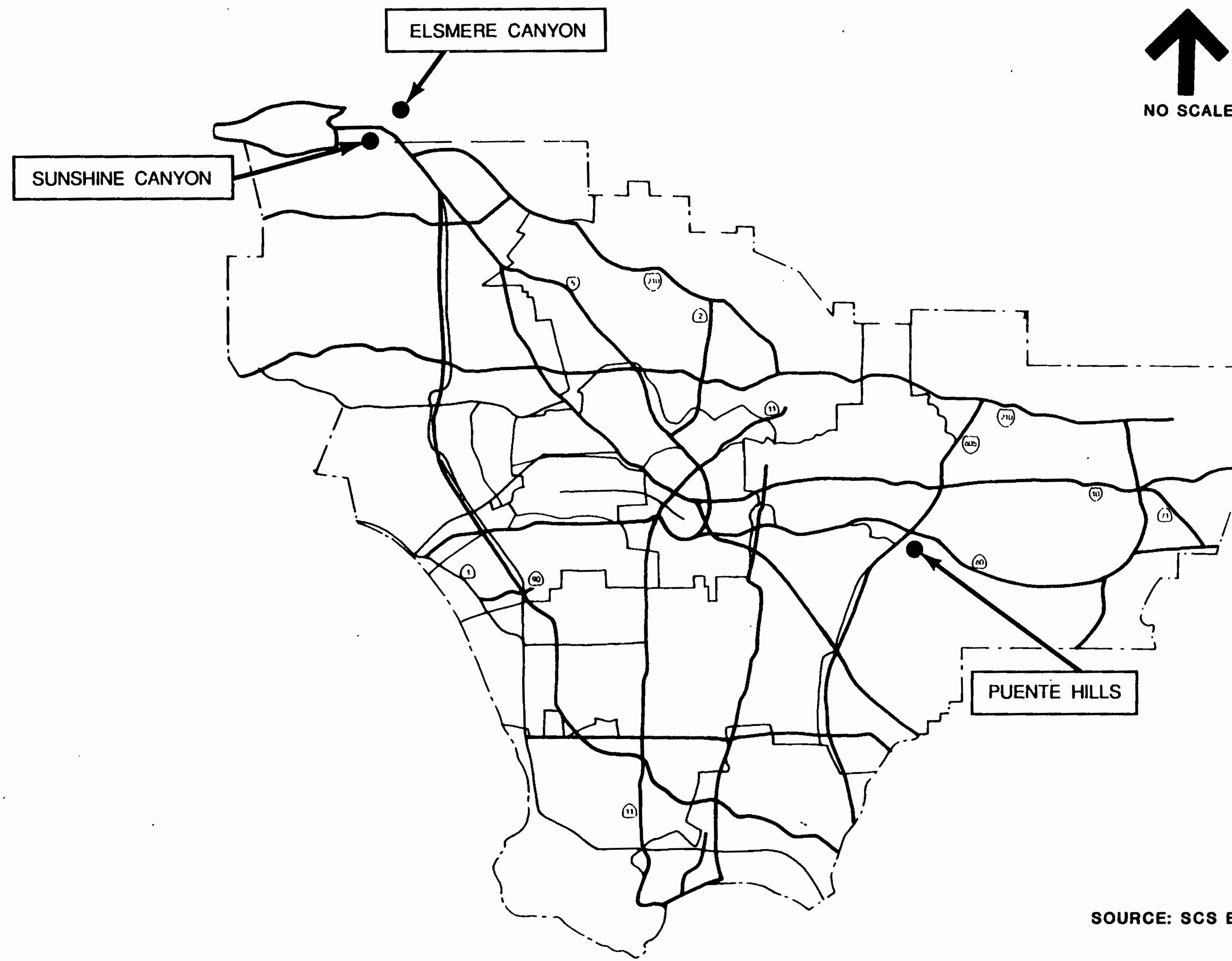
The existing Sunshine Canyon is located in the northwest portion of the City of Los Angeles immediately west of Interstate 5 (Figures 33 and 34). The facility receives between 5,000 and 7,000 tons per day and is permitted until September, 1991. The owner and operator, Browning-Ferris Industries, is proposing to expand the facility onto land within unincorporated Los Angeles County. The County recently approved a land use permit and certified the EIR to utilize a small portion of the potential expansion capacity of 70 million tons.

The Puente Hills Landfill is located southeast of the 60 freeway and I-605 in the San Gabriel Valley (Figures 33 and 35). It is owned and operated by the Los Angeles County Sanitation Districts. The existing land use permit for the site restricts the facility from receiving more than 12,000 tons per day. This permit expires in November, 1993. Of the estimated 106 million ton fill capacity of this site, approximately 75 million tons will remain when the permit expires. The sanitation districts are expected to initiate environmental analyses to expand the site in the near future.

The Elsmere Canyon Landfill is a proposed facility located at a site in unincorporated Los Angeles County east of the Antelope Valley Freeway and approximately two miles north of the intersection of the Antelope Valley Freeway and the Golden State Freeway (I-5) (Figures 33 and 36). The entire site is approximately 1,500 acres with the landfill utilizing 650 acres. The estimated disposal capacity is 190 million tons. Portions of the site are owned by the U.S. Forest Service. The project will also require a Conditional Use Permit from Los Angeles County. An EIS/EIR is currently being prepared jointly for the U.S. Forest Service and the Los Angeles County Regional Planning Commission, which are the co-lead agencies.

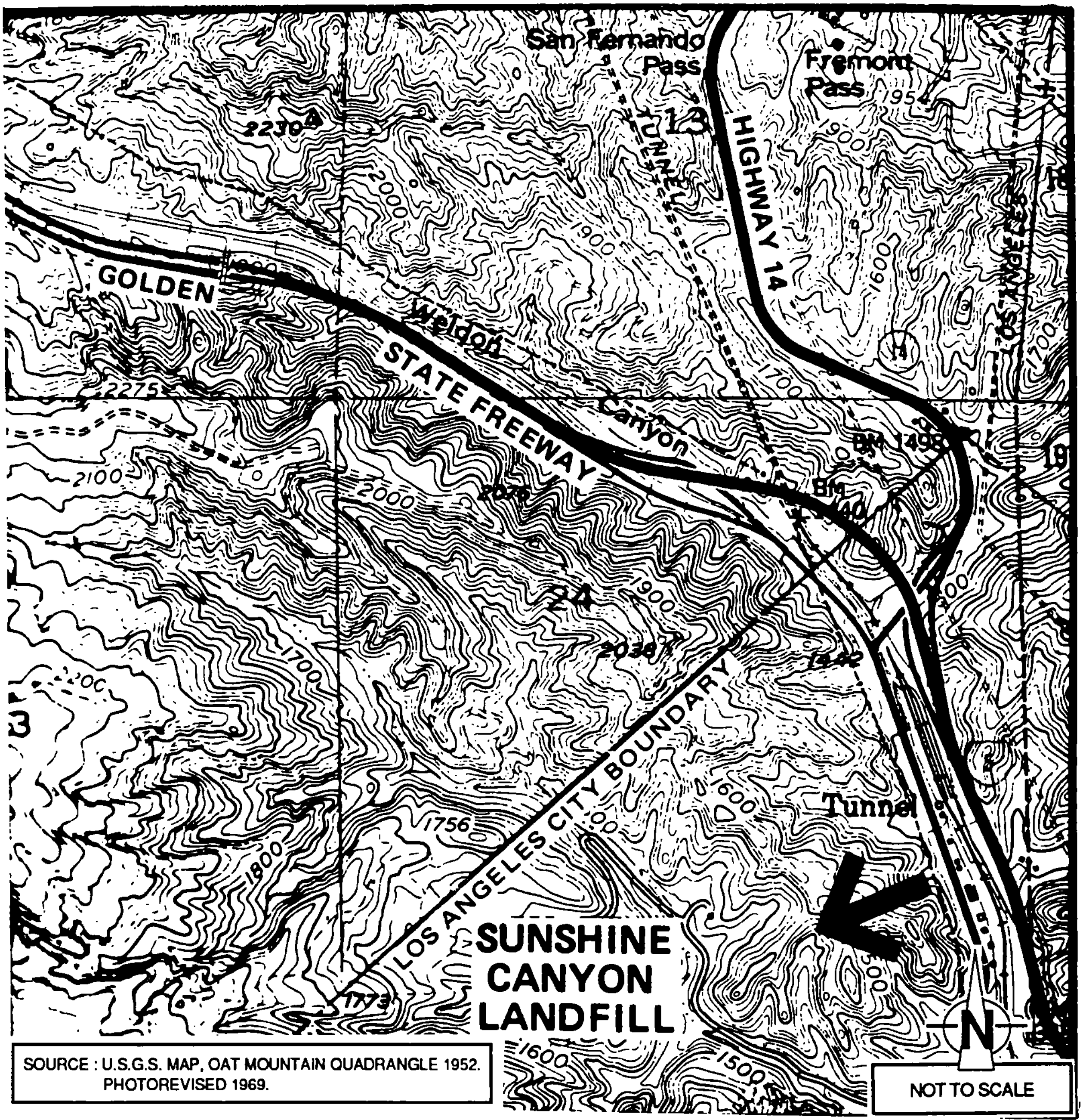
The proposed new Duncan Canyon Landfill site is located northerly of the I-15 freeway west of Lytle Creek (Figures 37 and 38) in San Bernardino County. The estimated landfill area would comprise approximately 228 acres; the total site area is approximately 326 acres. The estimated site capacity of 106 million cubic yards. Preliminary environmental studies conducted by San Bernardino County have eliminated Duncan Canyon as a potential future landfill site.

The proposed new Cleghorn Canyon Landfill site is located totally in the San Bernardino National Forest north of the Cajon Campground and east of Lost Lake (Figures 37 and 39). The estimated landfill area would comprise approximately 826 acres; the total site area is about 1,043 acres. The estimated capacity is 770 million cubic yards. Preliminary environmental



SOURCE: SCS ENGINEERS

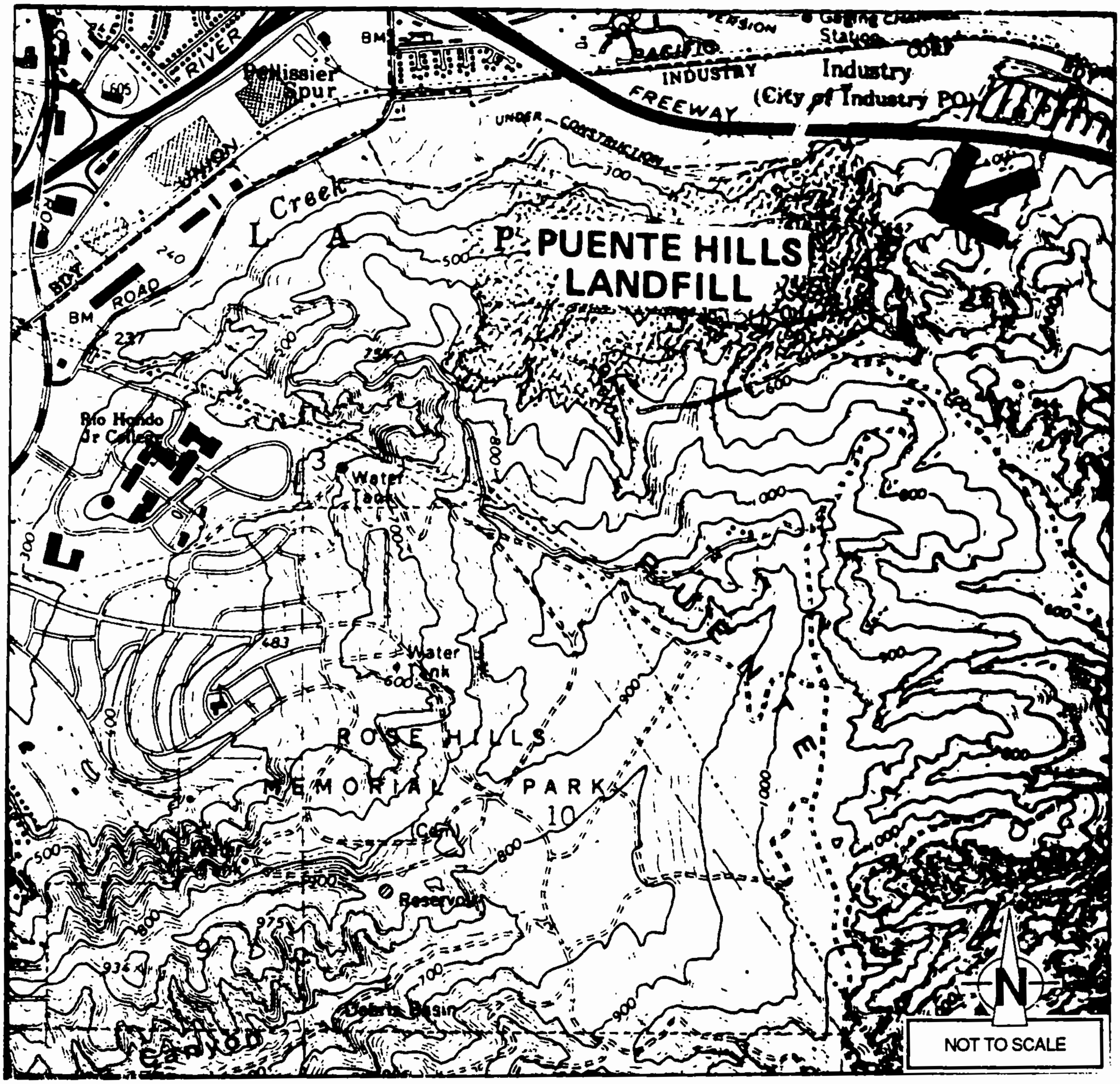
FIGURE 33. ALTERNATIVE LANDFILL SITES IN LOS ANGELES COUNTY



SOURCE: SCS ENGINEERS

FIGURE 34. SITE LOCATION MAP OF SUNSHINE CANYON LANDFILL – LOS ANGELES COUNTY

RECON



U.S.G.S. MAP, EL MONTE QUADRANGLE 1966.
PHOTOREVISED 1981.

SOURCE: SCS ENGINEERS

FIGURE 35. SITE LOCATION MAP OF PUENTE HILLS LANDFILL - LOS ANGELES COUNTY

RECON

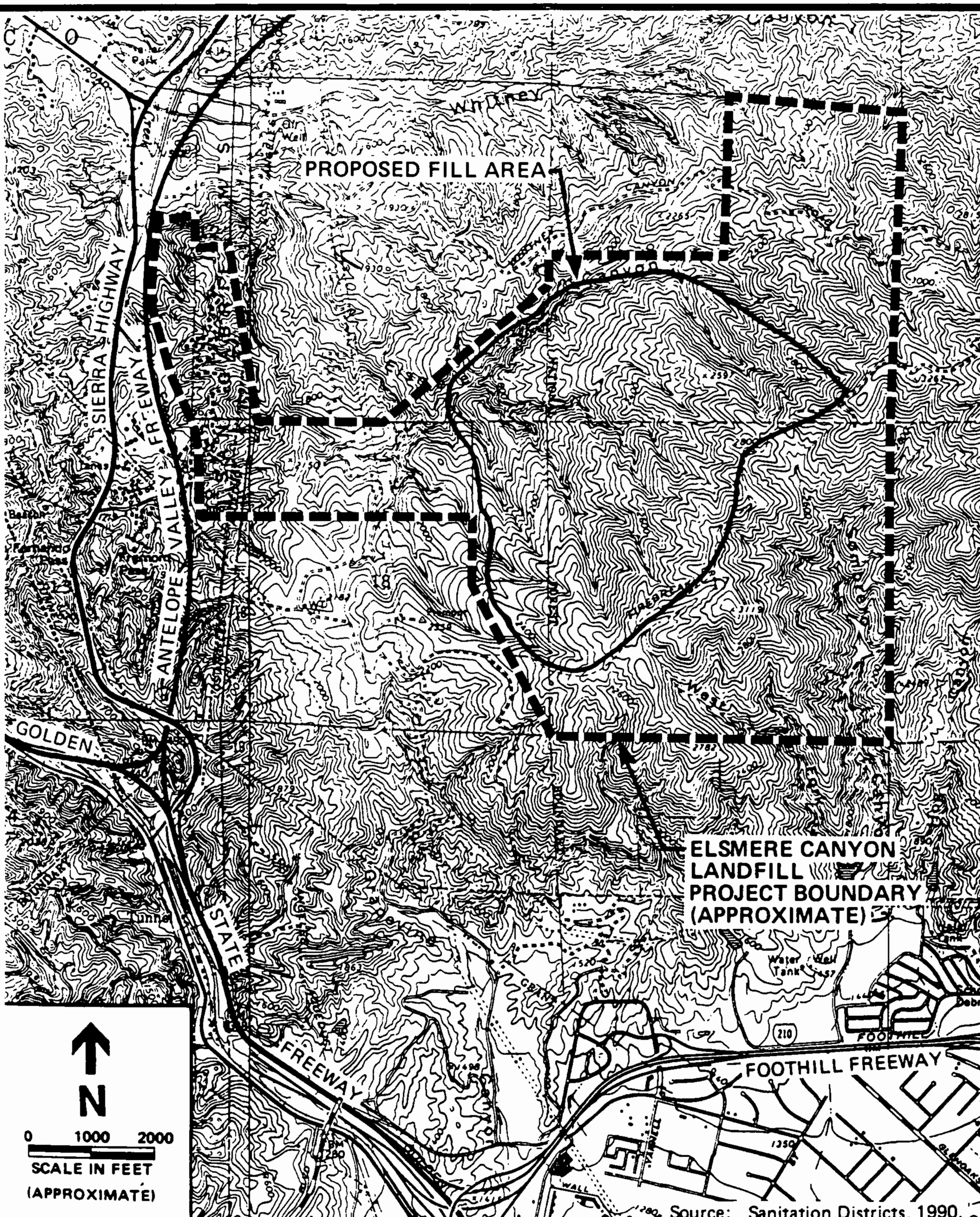
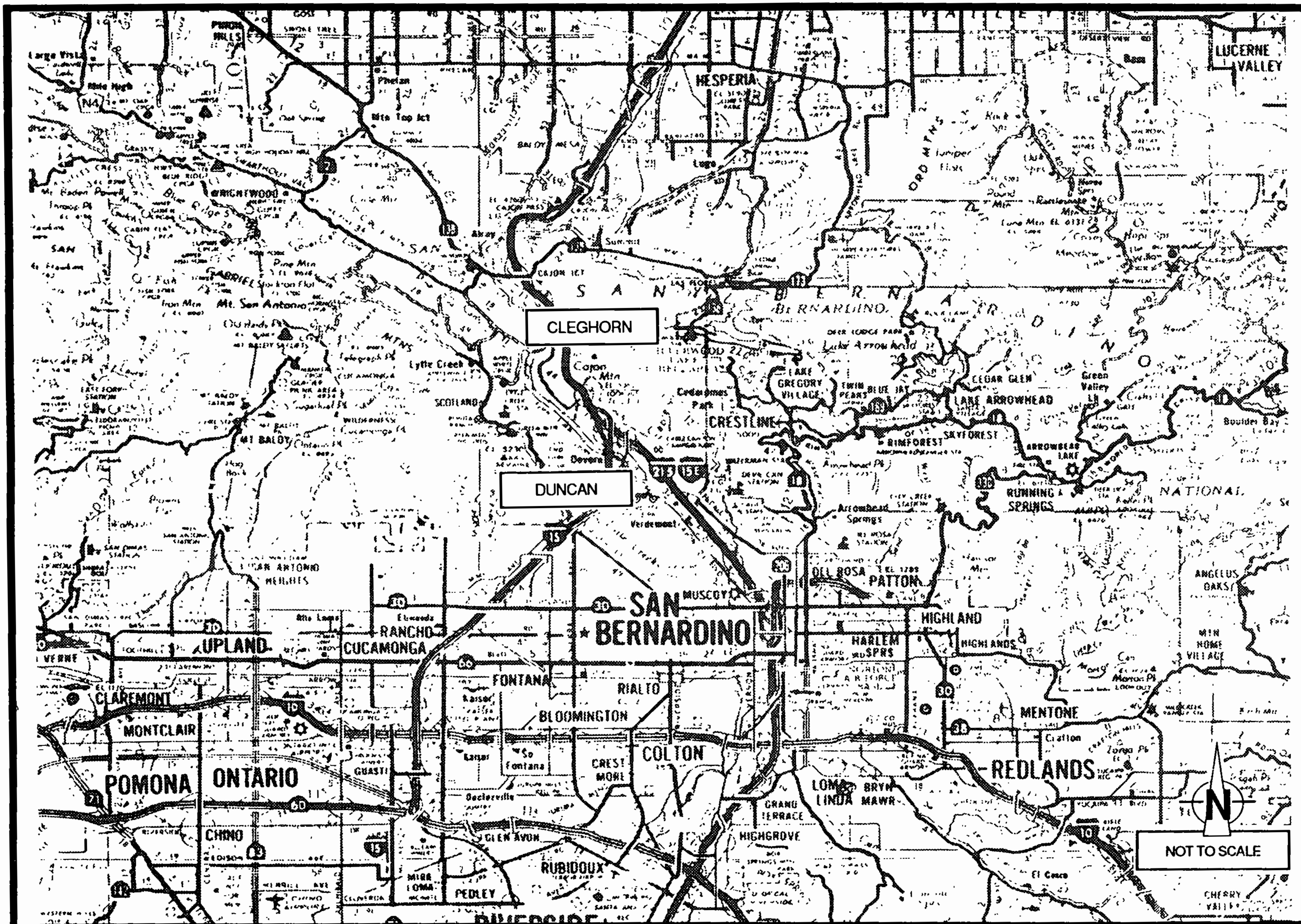


FIGURE 36. SITE LOCATION MAP OF ELSMERE CANYON LANDFILL – LOS ANGELES COUNTY

RECON



SOURCE: SCS ENGINEERS

FIGURE 37. ALTERNATIVE LANDFILL SITES IN SAN BERNARDINO COUNTY

RECON

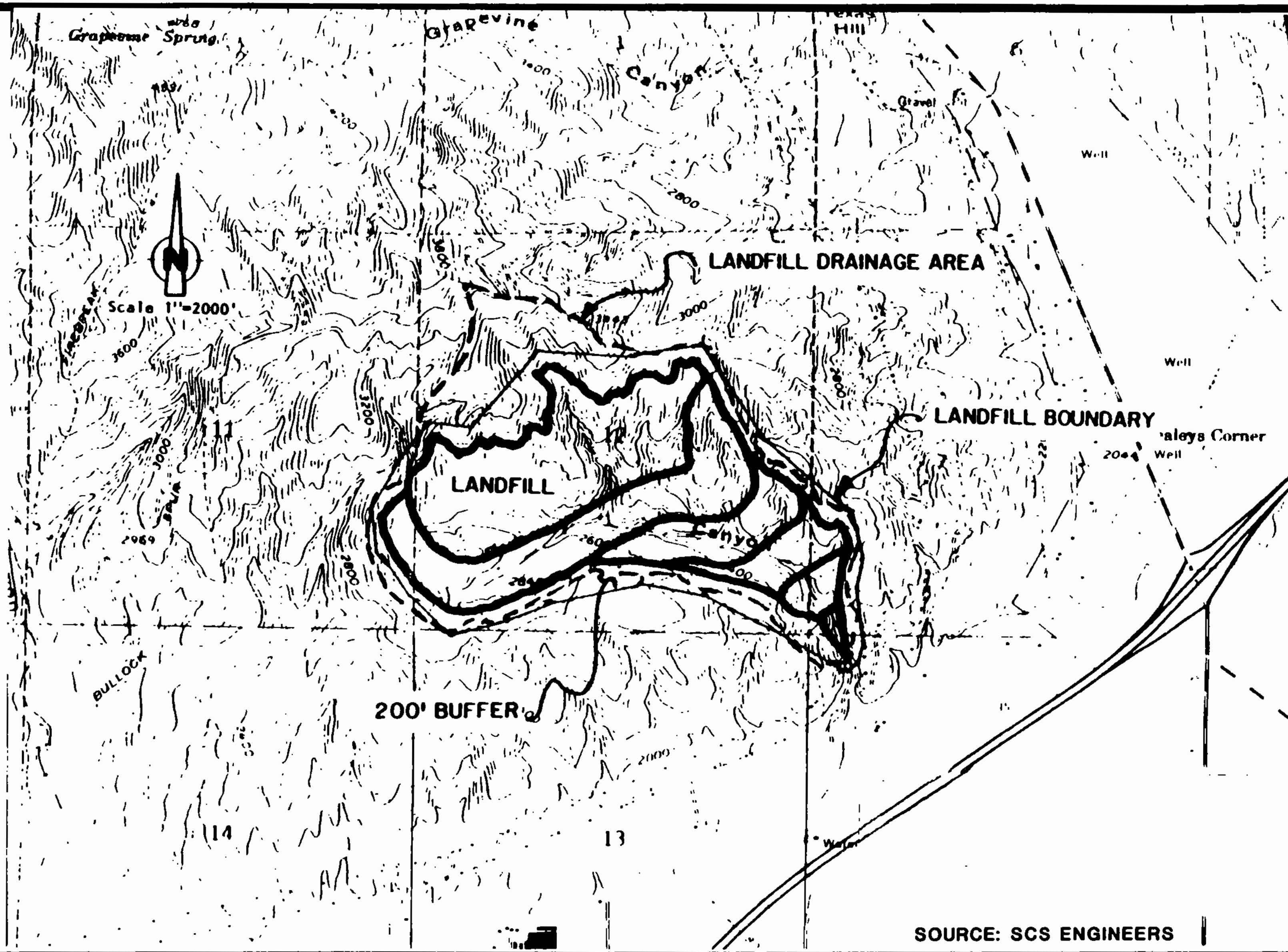


FIGURE 38. SITE LOCATION MAP OF DUNCAN CANYON LANDFILL – SAN BERNARDINO COUNTY

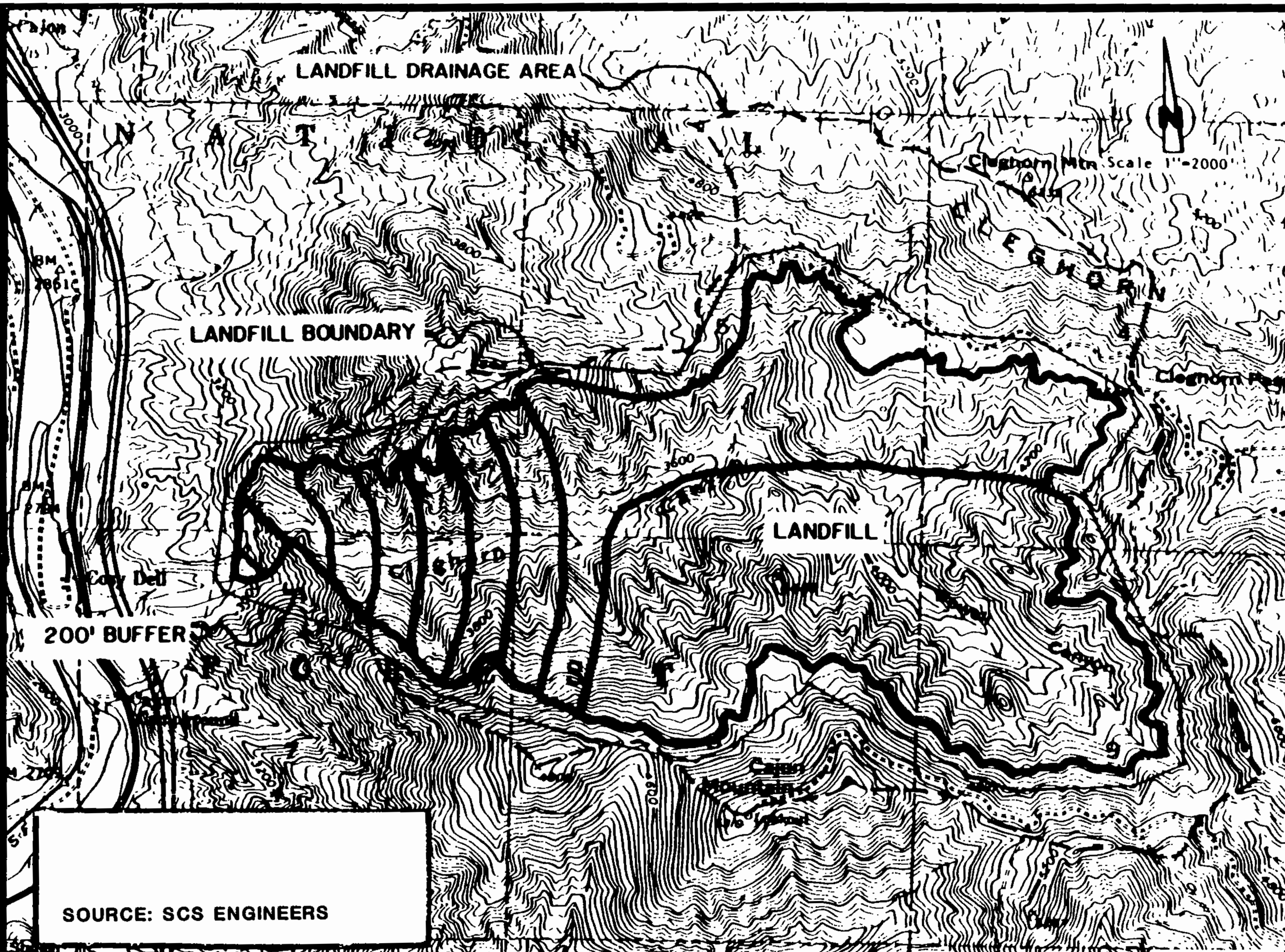


FIGURE 39. SITE LOCATION MAP OF CLEGHORN CANYON LANDFILL – SAN BERNARDINO COUNTY

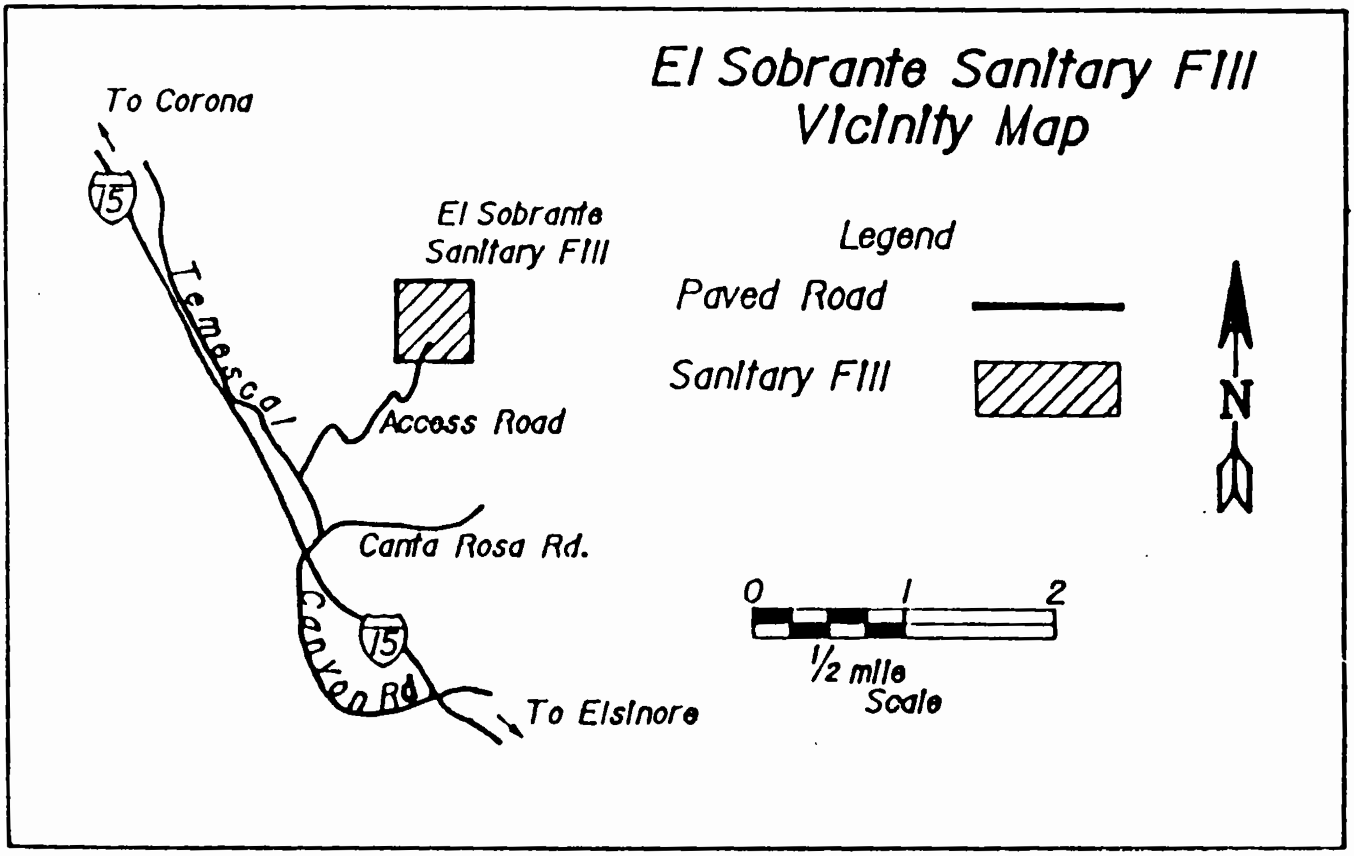
studies conducted by San Bernardino County have eliminated Cleghorn Canyon as a potential future landfill site.

The El Sobrante Landfill, operated by Western Waste Industries, is located east of I-15 in Corona (Figure 40). The facility currently serves waste generated in Corona, Norco, Lake Elsinore, portions of the City of Riverside, and nearby unincorporated areas. The existing site is approximately 160 acres and receives an average daily tonnage of almost 900 tons. The remaining fill volume is approximately 5,600,000 tons. The County Board of Supervisors has taken action to authorize negotiations on the expansion of the site. The Eagle Mountain and El Sobrante sites are tentatively identified facilities in the 1989 Tri-Annual Revision to the County Solid Waste Management Plan.

In summary, the Sunshine Canyon, Puente Hills, and El Sobrante projects involve the development of new disposal areas at existing landfills. The Elsmere, Cleghorn, and Duncan Canyon projects are new landfills. The size of these projects varies appreciably: (1) both Elsmere and Sunshine canyons have capacity to serve an operating volume similar to Eagle Mountain for the foreseeable future; (2) it is assumed that the inflow at Puente Hills will be the same or slightly greater than the existing inflow (12,000 tpd); (3) the El Sobrante Landfill will be closed in 2,000; and (4) information regarding capacity, inflow, and closure dates are not known for Duncan and Cleghorn landfills.

This alternative avoids a major source of air emissions from the project, that is, rail emissions from the transportation of waste to the project site. However, even with mitigation, emissions from landfill equipment and stationary source emissions from LFG thermal combustors or energy recovery facilities at these alternative future sites would still be considered significant using the air quality significance criteria in Section IV.D.

In the air quality technical report, emissions from the proposed action were compared quantitatively with an "In-Basin" alternative. This alternative assumes that southern California's landfill needs will continue to be met through use of existing and additional capacity within the South Coast Air Basin. Under this alternative, truck traffic associated with residential and commercial waste pickups would be identical with that associated with the Eagle Mountain project. (These impacts were assumed to be identical for all cases and thus were not quantified.) In addition, it was assumed that there would be a slight increase in truck travel distances to transfer stations and/or landfills. This increase in truck traffic was based on the following estimates of replacement and expanded landfill capacity (Table 4):



SOURCE: RIVERSIDE COUNTY SOLID WASTE MANAGEMENT PLAN, 1989

FIGURE 40. SITE LOCATION MAP OF EL SOBRANTE LANDFILL–
RIVERSIDE COUNTY

RECON

TABLE 4
INCREASED TRAVEL DISTANCES TO TRANSFER STATIONS ASSOCIATED WITH ALTERNATIVE LANDFILL SITES

Origin of Waste Material	Estimated Quantity (tons/day)	Additional Round-trip Distance
Orange County	2,000	0 miles
Riverside County	2,000	0 miles
San Bernardino County	2,000	60 miles
San Gabriel Valley	7,000	0 miles
Central LA/SF Valley	5,000	20 miles
Weighted Average	18,000	12.2 miles

For this case, no use of rail was assumed. With respect to waste handling equipment at the landfill, project emissions were assumed to be associated with landfill face operations; cover excavation, hauling, and daily application; and road maintenance. Landfill gas generation was conservatively assumed to be the same as the amount estimated for the Eagle Mountain project, although the higher moisture levels and rainfall in the South Coast Air Basin would be expected to result in significantly more landfill gas generated for each ton of waste buried. Compliance with applicable dust control regulations and best available control technology was also assumed for this alternative.

The emissions associated with this alternative are compared with the proposed action, the reduced landfill operations alternative, and the alternate remote disposal alternative in Section IV.D. of this draft EIS/EIR.

Because this alternative would not eliminate the one significant nonmitigable impact related to the project (i.e., air quality), it is not environmentally superior under CEQA. This alternative also does not achieve consistency with the existing policy in the air quality management plan to transport biodegradable wastes by electrified rail lines to landfills outside the South Coast Air Basin.

The diversion of long-distance rail trips to short-distance truck trips to serve these alternate sites would result in less energy consumption relative to the proposed action. In addition, because of the arid climate at Eagle Mountain, potential energy recovery over the life of the proposed action is probably less at the project site than could be achieved at the alternative sites with comparable capacities and inflows.

Although subject to site-specific mitigation measures, this alternative gives rise to the following environmental issues which are not encountered with the proposed action.

If Elsmere is not developed and Sunshine Canyon is not expanded, the use of multiple sites (to achieve 20,000 tpd refuse disposal) may result in a higher incremental risk to regional groundwater resources than would occur from using any single site. At a minimum, the use of multiple sites creates the need to design site-specific containment facilities and to implement groundwater monitoring programs at each location.

Some of these sites (e.g., Puente Hills and Sunshine and Elsmere canyons) are relatively close to or are anticipated to be affected by the spread of urban development within Los Angeles County. This proximity and attendant land use compatibility problems would not be encountered at the project site. The control of development achieved through the implementation of specific plans for both the landfill and the town of Eagle Mountain and the lack of other pressures to urbanize near the project site enable the project to achieve a higher degree of land use compatibility than may occur in proximity to alternative sites.

The use of these alternative sites would not necessarily involve processing wastes through MRFs, where recyclables and hazardous materials would be removed from the waste stream. However, under AB 939 mandates, it is expected that a majority of the existing wasteshed will need to be processed through MRFs to ensure compliance with landfill diversion mandates (25% by 1995, 50% by 2000). Under this alternative, loads would be checked for hazardous materials at the landfill. It is not clear that they would undergo the scrutiny they would receive at an MRF, where all waste would be removed from trucks, sorted, and loaded into shipping containers or long-haul waste trucks. Although these landfills may also be designed to jointly serve as recycling/waste recovery centers, projects have not been defined in sufficient detail to determine whether they would serve this purpose.

Other significant impacts associated with the development of these sites include the loss of oak trees at Sunshine Canyon, the loss of Stephens' kangaroo rat habitat at El Sobrante, the need to construct transportation improvements if either Duncan or Cleghorn Canyon is developed, the loss of potential paleontologic resources at Elsmere Canyon, and the visibility of trucks and the front face of landfill areas if new canyons are proposed for development at Puente Hills. While many, if not all, of these impacts can be mitigated, the same is true of other potentially significant impacts at Eagle Mountain. Since this alternative would not reduce air emissions to levels of insignificance, it is not considered environmentally superior under CEQA.

H. Alternatives Considered but Eliminated from Detailed Analysis

1. Landfills in Counties Where Waste Is Generated

Other potential landfill sites in Los Angeles County, namely, Towsley Canyon, Blind Canyon, and Mission–Rustic Canyon, were not analyzed in further detail because of their limited capacities and because inadequate information is currently available regarding the description of projects at these sites. Consequently, they were deemed, at this time, to be remote and speculative.

2. Alternative Sites in the Eagle Mountains

a. Central Pit

This alternative site was not analyzed in further detail because it is more distant from the proposed Phase II container handling yard and at a substantially higher elevation. The capacity of the central pit is substantially less than that of the proposed project.

b. Black Eagle Pit

This alternative site was not analyzed in further detail because the Black Eagle Pit is closer to the ridge line that would make the landfill potentially visible from Joshua Tree National Monument. A potential exists that some precious metals deposits are located adjacent to the Black Eagle Pit. Using this alternative could preclude mining these resources and could represent a significant impact.

3. Waste Diversion Programs

While waste diversion programs reduce the waste stream by diverting waste from landfills and potentially reduce the environmental impacts associated with landfills, they would not eliminate the need for new or expanded landfills in southern California. Therefore, waste diversion programs were considered but eliminated from detailed analysis. Nevertheless, the discussion of impacts related to the implementation of waste diversion technologies is included in this draft EIS/EIR to respond to comments received on the Notice of Preparation. The programs included herein for informational purposes are recycling, green waste composting, and waste reduction.

Although waste-to-energy (thermal combustion) is also a technically feasible means to avoid impacts associated with landfilling, an assessment of this technology is not included, since it is not anticipated to reduce air quality impacts to levels of insignificance. This conclusion is based on a comparison between the proposed project and the San Diego Energy Recovery (SANDER) Project (Signal Environmental Systems, Inc. 1985). The SANDER project, which was to recycle 2,250 tpd of municipal solid waste, was anticipated to generate 2,600 tons per year (tpy) of nitrogen and sulfur oxides (NOx and SOx), and 24,000 tpy of total suspended particulates (TSP) after mitigation. The proposed Eagle Mountain landfill, with an inflow capacity of 20,000 tpd of municipal solid waste (8.8 times more than the SANDER project) would generate 22,880 tpy of SOx and of NOx and 211,200 tpy of TSP. Given that the Environmental Protection Agency (EPA) threshold emission levels are 40 tpy for NOx and SOx and 25 tpy for TSP, the emissions resulting from a waste-to-energy operation at the Eagle Mountain landfill would represent a substantial and significant air quality impact.

a. Recycling

The Eagle Mountain project would include the use of transfer stations/materials recovery facilities to support recycling programs. Although the size and locations of these facilities have not been identified, the project applicant intends to dispose of primarily nonrecyclable solid wastes. An area at the project site has been designated for the storage of recyclables removed from the solid waste stream at the MRF.

Recently enacted state legislation (AB 939) establishes goals to divert 25 percent of the solid waste from landfills by 1995 and to divert 50 percent by the year 2000 through recycling and waste reduction programs. These recycling goals include yard wastes that can be composted (see following section). Under this legislation, cities and counties are responsible for developing integrated solid waste management plans to achieve these goals by 1992. This legislation does not prescribe methods to achieve these goals or require that certain types of wastes be recycled. The City of Los Angeles has recently adopted an ordinance which requires the diversion of recyclable municipal materials. This ordinance, however, does not include industrial or high density residential waste.

The implementation of recycling programs to achieve these goals would result in two types of impacts: (1) those related to the operation of landfills and (2) those related to the collection, recovery, and reuse of municipal solid waste.

Impacts Related to the Operation of Landfills

The major impact related to landfills would be to conserve available landfill capacity and reduce the need to site new land disposal facilities. Assuming achievement of the legislative goals, the need for new or expanded landfill facilities would be approximately half of the anticipated capacity shortfall in Los Angeles County. Under these circumstances, the landfill capacity shortfall would still be large enough to require a project of the magnitude of Eagle Mountain or a number of smaller projects with the same combined inflow (20,000 tons per day) as the project.

Public safety impacts related to landfills such as LFG migration; condensate and leachate treatment and disposal; and surface, subsurface, and right-of-way fires are not encountered in recycling and recovery operations. Recycling operations, however, involve some of the same public safety impacts as the project (e.g., the presence of hazardous materials in solid waste, vectors, smoldering loads). Similarly, assuming that these recycling facilities are located either in existing industrial areas or at existing landfills, they are less likely to involve the loss of biological and cultural resources than may occur in conjunction with the use of undeveloped areas for land disposal facilities.

Impacts Related to the Collection, Recovery, and Reuse of Municipal Solid Waste

A number of impacts related to recycling would depend upon the location of new facilities. It has been suggested, for example, that existing landfills be used as the site of recycling/recovery facilities. Under these circumstances, the distance between collection routes and recycling facilities would be similar to the current distance between collection routes and disposal facilities. As developed (disturbed) sites, processing and transfer stations at existing landfills are not anticipated to result in the loss of significant cultural and biological resources. If recycling facilities are located within existing urban/industrial areas closer to where waste is generated, the vehicular impacts of transporting waste to these facilities may be somewhat less than occurs under existing conditions. Land use, visual and aesthetic resources, local traffic, surface runoff, and a variety of other impacts would all depend on the location of these facilities.

As new recycling programs are implemented over the life of the project, this form of waste diversion may lead to significant changes in waste collection methods and vehicular impacts related to the transportation of solid wastes. Impacts would vary in terms of whether waste is hauled and separated at processing and transfer stations, whether recycling programs utilize drop-off centers or provide curbside service, whether curbside service is provided by vehicles which compartmentalize recyclable and disposable wastes, or whether recyclable wastes are collected in separate vehicles. The manner in which waste is transported to processing and transfer stations (whether waste is separated and collected at the curb or whether it is separated and sorted at the processing and transfer stations) would, in turn, affect impacts related to the operation of these facilities.

Related to both the operation of landfills and the collection, recovery, and reuse of municipal solid waste is the uncertainty regarding the volumes and types of wastes to be recycled which makes it speculative to estimate the effects of recycling on LFG production and the moisture content of waste at the project site or other landfills. The effect of recycling on gas production and moisture would, in turn, affect air emissions and the potential generation of leachate.

b. Yard Waste Composting

Estimated at approximately 30 percent (by weight) of the residential waste generated in the city of Los Angeles, the diversion of yard waste from landfills is viewed as critical in meeting the recycling goals of the state legislation noted above. Although there is great potential use of yard waste compost, markets do not exist for this material. Except as noted below, the development of yard waste composting facilities involves many of the same impacts identified in conjunction with recycling facilities.

The utilization of yard debris compost and mulch represents a form of recycling that requires a larger processing facility than is necessary for the recovery of other types of municipal solid waste. Although it is conceivable that yard waste composting could be conducted indoors, the use of outdoor facilities raises environmental issues related to odors and visual impacts. Noise impacts related to the use of equipment to support composting operations (chippers, grinders, etc.) may also be of concern. The significance of these impacts can only be determined in the context of site-specific situations.

c. Source Reduction

Source reduction generally refers to measures which reduce the amount or types of municipal solid waste generated. For example, source reduction related to yard waste composting may involve landscaping for low-water-use requirements or home mulching. Another potential source reduction measure would be to ban nonbiodegradable plastic bags and wrapping materials. By definition, these measures would reduce the overall demand for waste management facilities. Different types of source reduction measures may be appropriate for commercial, industrial, and single- and multi-family residential use.

Potentially, source reduction measures would have a number of impacts:

1) As with recycling, source reduction would conserve available landfill capacity.

2) Source reduction would reduce all vehicular impacts (traffic, air, energy, noise) related to the transportation of wastes to recovery and/or disposal facilities.

3) Source reduction would result in a reduction in the scale of operations and environmental impacts associated with the use of equipment at waste collection, transfer, and disposal facilities.

4) Source reduction may result in increased air emissions and noise depending on the equipment used (small chippers). Relative to all other waste disposal/diversion options, however, source reduction would result in the least adverse environmental impacts.

The major question related to source reduction is how effective it would be in reducing the amount of waste generated. The City of Los Angeles Recycling Implementation Plan estimates that between five and eight percent of all yard debris generated could be reduced at the source by the end of the City's five-year program. In terms of volume, this type of source reduction is likely to be greater than the reduction of other types of solid wastes. Achieving this reduction, however, would require large-scale promotional and educational programs and possible ordinances directed at new commercial, industrial, and large residential projects.

III. Affected Environment

A. Water Quality and Use

The following discussion on water quality is based on information prepared by SCS Engineers in January and June 1990. The technical report may be found in Appendix C of this draft EIS/EIR.

1. Groundwater Quality

a. Geologic Setting

The Eagle Mountain site is located in the Colorado Desert physiographic province of California. The topography of this province is characterized by isolated, north/south-trending mountain ranges separated by broad, flat, alluvium-filled valleys.

The proposed landfill site lies at the eastern edge of the Eagle Mountains. This mountain range has elevations ranging from about 1,200 to 3,900 feet above mean sea level. This and other mountain ranges in the area surrounding the site (the Chuckwalla, Coxcomb, and Palen mountains) are made up predominantly of granitic rocks which are intruded into metamorphosed sedimentary rocks. The metamorphic rocks consist of marble, quartzite, schist, and minor gneiss.

Together with minor amounts of Quaternary (up to two million years in age) basaltic extrusive igneous rock, the granitic and metamorphic rocks make up the exposed consolidated rock in the area. Regionally, the older bedrock is cut by numerous inactive northwest/southeast-trending faults which dip nearly vertically. The fault planes exhibit narrow, slickensided, clay-bearing, and brecciated zones which may show extensive solutional activity (Dubois and Brummett 1968). In addition, well-developed joint systems are present in the Mesozoic and older rocks. These are discussed in greater detail below (Occurrences and Movement of Groundwater subsection) and in the Geology section.

Quaternary alluvial deposits are found above the bedrock. These deposits, consisting predominantly of sand and gravel with small amounts of silt and clay, fill the valleys and can reach considerable thickness. Drilling in the Chuckwalla Valley indicates that porous alluvial fill is at least 1,200 feet thick, extending three miles east of the front of the Eagle Mountains. Some Quaternary dune sand and lacustrine clay, silt, and sand are exposed in the central portions of the valleys. No evidence of faulting young enough to affect these deposits have been found in the proposed project area.

b. Areal Drainage

Drainage in the area basins is internal. Surface drainage is from the surrounding mountains into the Pinto and Chuckwalla Valley basins. In the immediate project area, drainage is from the Eagle Mountains easterly into the Chuckwalla Valley. A discussion of areal drainage appears in Section III.F., Surface Drainage and Flooding.

During and immediately after heavy rains, streams are formed within the Eagle Mountains and surrounding valleys. Streamflow within the Pinto Valley, north of the proposed landfill site, is predominantly easterly. Some surface water may flow from the Pinto Basin drain into the northwestern arm of the Chuckwalla Valley, which adjoins the proposed landfill site to the east. Drainage in the western part of the Chuckwalla Valley flows generally southeasterly towards Palen Dry Lake. Drainage from the eastern part of the Chuckwalla Valley is towards Ford Dry Lake. Streamflow within the project area is also discussed in the section on drainage existing conditions.

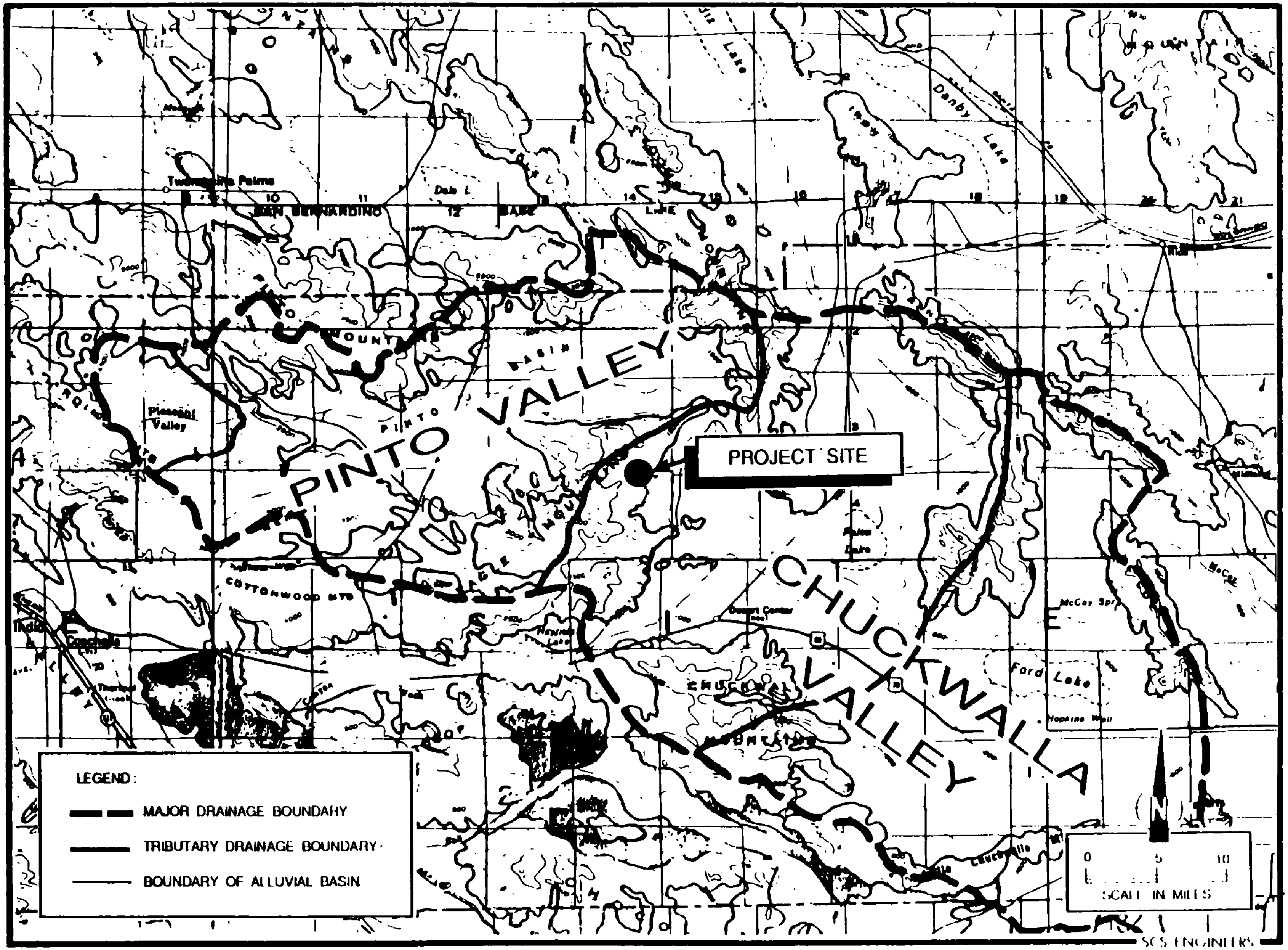
c. Groundwater Basins

Groundwater basins in the region include the Pinto Valley basin, which lies about four miles north of the proposed landfill site, and the Chuckwalla Valley basin, which adjoins the site on the east (Figure 41). These basins are composed mainly of Quaternary alluvium. The mountain areas adjoining these basins are underlain principally by older igneous and metamorphic rocks of low permeability and porosity, which do not readily yield groundwater to wells in usable quantities. The Pinto Valley and Chuckwalla Valley groundwater basins are considered to be coextensive with the Pinto Valley and Chuckwalla Valley drainage basins (see Figure 41). Basic hydrogeological data on these basins are summarized in Table 5.

Pinto Valley Basin

The Pinto Valley groundwater basin covers 310 square miles, most of which is within Joshua Tree National Monument. This groundwater basin is estimated to have a storage capacity of 230,000 acre-feet and a usable capacity of 130,000 acre-feet (State of California 1975). Groundwater from this basin has only very limited uses at present. Kaiser Steel pumped between 2,300 and 3,900 acre-feet of water per year from two wells (Pinto wells) between the years 1962 and 1982. These wells are located one-half mile northwest of the point where the Pinto Valley joins the Chuckwalla Valley (Mann 1967).

The most complete description of the hydrogeology of the Pinto Valley groundwater basin to date is found in Kunkel (1963). Groundwater flow in the basin is generally towards the eastern end of the valley, where it proceeds southward into the Chuckwalla Valley. Water level in the northernmost of the Kaiser Pinto wells (Well No. 3S/15E-4K) was measured at approximately



SOURCE: SCS ENGINEERS

FIGURE 41. GROUND WATER BASINS IN THE EAGLE MOUNTAIN AREA

TABLE 5
SUMMARY OF HYDROGEOLOGICAL DATA
ON LOCAL GROUNDWATER BASINS

Area of Basin (sq. mi.)	Depth to Groundwater (feet)	General Direction of Flow	Inflow to Basin	Underflow Out of Basin	Storage Capacity (acre-feet)
			PINTO VALLEY BASIN		
310	20-450	East	Precipitation	Chuckwalla Valley	230,000
			CHUCKWALLA VALLEY BASIN		
870	20-600	Southeast	Precipitation, Pinto Valley, Cadiz Valley, Orocopia Valley	Palo Verde Mesa	9,100,000

122 feet below ground surface on September 11, 1989 (approximate elevation 936 feet above MSL).

Water quality data from the Pinto Valley groundwater basin wells is summarized in Table 6. The water in this basin can be characterized as having total dissolved solids (TDS) content averaging about 600 milligrams per liter (mg/l) and relatively high levels of sodium and sulfate. Sodium, bicarbonate, chloride, sulfate, and fluoride average about 200, 90, 100, 240, and 2 mg/l, respectively.

Chuckwalla Valley Basin

The Chuckwalla Valley groundwater basin is an 870-square-mile basin with internal drainage. It consists of a broad, alluviated valley bounded on the south by the Orocopia, Chuckwalla, Little Chuckwalla, and Mule mountains. It is bounded on the west by the Eagle Mountains and on the east by the Mule and McCoy mountains. Several northerly trending mountain ranges (the Coxcomb, Granite, Palen, and Little Maria mountains) bound the valley to the north and extend into the valley. The intervening valleys are contiguous with and tributary to the main part of Chuckwalla Valley (Giessner 1963).

There are no perennial streams or any permanent natural bodies of water in the Chuckwalla Valley. During heavy rains, some precipitation runoff may flow into sinks at Palen and Ford dry lakes and standing water may occur at these lakes for a short time.

Subsurface flow into the Chuckwalla Valley is from three sources: the Pinto Valley to the northwest, the Hayfield Basin to the west, and the Cadiz Valley to the north. Mann (1986) estimates inflows of 2,500 acre-feet of water per year from the Pinto Basin, if none is intercepted by wells (as is the case at present); 1,700 acre-feet per year from the Hayfield Basin; and an unknown amount from the Cadiz Valley. The northwestern Chuckwalla Valley is replenished by groundwater inflow from the Pinto Basin and runoff from the slopes of the mountains surrounding the valley. Except during heavy rainstorms, most of the rain falling directly on the valley floor is probably lost to evapotransporation and does not add materially to groundwater recharge. This is because the small amount of rainfall normally experienced evaporates rapidly in the arid climate or is used by plants before deep percolation can occur.

Subsurface flow in the Chuckwalla Valley is generally towards the east, with south to southwest flow in the northern arms of the valley. Water level elevations range from an estimated 800 feet above MSL at the boundary between Chuckwalla Valley and Pinto Basin to below 500 feet MSL in the airport area.

In the northwestern Chuckwalla Valley, groundwater is used beneficially for irrigation and for domestic and industrial uses. Groundwater quality in the basin ranges from fairly good to poor, with TDS ranging from 274 to 12,300 mg/l (State of California 1979). Koehler and Mallory

TABLE 6
PINTO BASIN WATER QUALITY DATA

Well Well # Date	KS Pinto 1 3S/15E-4K1 2/11/56	Park Serv. 2 3S/15E-4J 12/5/54	KS Pinto 1,9 3S/15E-4K1+ 3S/15E-4K2 11/30/57	KS Pinto 1,9 3S/15E-4K1+ 3S/15E-4K2 1/6/83
pH	8.2	8.1	7.7	8.3
Electrical conductance	1,010		1,020	990
TDS	618	571	598	610
Calcium	10	14	11	16
Magnesium	0.7	0.7	2	0
Sodium	280	199	200	196
Potassium	3.2		3.5	5
Iron		0		0.03
Bicarbonate	118	77	102	85
Carbonate	0	8	0	0
Sulfate	216	245	216	234
Chloride	102	97	104	82
Nitrate	18		22	15
Fluoride	2		2.5	
Hardness	28	38	36	

NOTE: Analyses in mg/l except for electrical conductance (micromhos) and pH.

(1981) state that the average TDS content of wells used in their study is 2,100 mg/l. Water quality is generally better than this average in the western parts of the valley and becomes worse in wells further east, particularly those near Ford Dry Lake. Fluoride content ranges from about 1 to about 12 mg/l and is generally above federal drinking water standards; sulfate and sodium concentrations are relatively high as well.

d. Hydrogeologic Setting

The hydrogeologic units in the Chuckwalla Valley area include igneous and metamorphic rocks and unconsolidated sedimentary deposits. Igneous rocks are generally considered to be non-water-bearing, since they do not normally yield usable quantities of water to wells. The porosity of igneous and metamorphic rocks is very low; however, since much of the bedrock in the Eagle Mountains is fractured and is able to store water, connections between the fractures in bedrock may provide pathways for the movement of groundwater.

Because water is readily available from the alluvial deposits in the northwestern Chuckwalla Valley, few attempts have been made to drill water wells into bedrock. One exception is the Eagle Mountain School well (4S/14E-1M), which was drilled in late 1985 and completed in early 1986. In this well, alluvial deposits were encountered from 1,500 feet MSL to 1,300 feet MSL of the borehole and extended to the bedrock below. The well was completed to produce water from fractured bedrock, with perforations between 1,025 feet MSL to 751 feet MSL.

The unconsolidated and semiconsolidated sediments were deposited in a continental environment prior to two million years ago. Some of the sedimentary units penetrated by deep wells in the valley may be late Tertiary in age (2 million to 20 million years old). Many of the sediments were deposited in alluvial fan, stream channel, lake, or playa environments, though some were deposited as windblown sand. The majority of this material consists of alluvial sand and gravel, but some silts and clays were deposited as well, particularly in the central parts of the basin. Some of the alluvial material has been cemented by caliche.

In the northwestern Chuckwalla Valley, four sedimentary units of up to two million years in age are primarily encountered and include alluvial fan deposits, younger alluvium, older alluvium, and windblown sand. These units are described below.

The older alluvium is of Pleistocene age (11,000 to 2 million years ago) and consists of fine to coarse sand interbedded with gravel, silt, and lesser amounts of clay. Surface exposures of the older alluvium are limited, but the unit is extensive in the subsurface where thickness ranges to over 300 feet. This unit yields water readily to wells and is the most important aquifer in the area.

The fan deposits of the Pleistocene age consist of poorly sorted boulders, gravel, coarse to fine sand, silt, and a minor amount of clay. This unit is found most typically at the margins of the valley, but fingers of alluvial fan deposits in the subsurface may extend out almost to the center of the valley. The fan deposits are generally above the water table and therefore do not form an important aquifer, although they are generally porous and permeable.

The younger alluvium, of Holocene age (present time to 11,000 years old), consists of gravel, sand, silt, and lesser amounts of clay. This unit is generally less than 25 feet in thickness and is above the water table in most areas. The unit is, however, porous and permeable. It is most extensively developed in the central valley.

A belt of windblown sand of Holocene age lies between the central axis of the valley and the Coxcomb Mountains in the northwestern Chuckwalla Valley area. This deposit ranges in thickness up to 25 feet and consists of medium- to fine-grained sand. This unit appears to be above the water table in all areas. However, similar units of Pleistocene age may exist in the subsurface and could yield water to wells.

e. Discharge of Water during Mining Operations

The proposed project was formerly the site of iron mining, ore processing, and ancillary operations, which took place between 1943 and 1983. Some of these former operations resulted in the discharge of industrial water which had the potential for affecting groundwater.

During mining operations at the Kaiser Eagle Mountain iron mine, wet waste rock (coarse tailing) was discharged from the ore processing plant on a heap south of and adjacent to the East Pit. Large quantities of water were used to transport fine tailing (sand to clay-sized particles) to the fine tailing basins located south of the East Pit.

The fine tailing basins cover a total area of approximately 540 acres. There are seven fine tailing basins, two of which never received tailing. Waste containment structures consist of berms or dikes constructed of alluvial material and crushed rock from mining operations. The berms are trapezoidal in cross section and range up to about 80 feet in height. The inner surfaces of the berms and the floor of four of the basins were lined with compacted low-permeability fine tailing material. This material limited the amount of water which could percolate into the soil underlying the basins.

Based on measurements made during the early 1970s, an average of about 2,600 acre-feet of water per year was discharged to the fine tailing basins. Normally, slightly over half of this water was pumped out of the basins and recycled to the process plant. An additional 25 percent was lost to evaporation and about 12 percent remained in the interstices between sediment grains. The remaining 12 percent may have percolated into the alluvial sediments below the tailing basins.

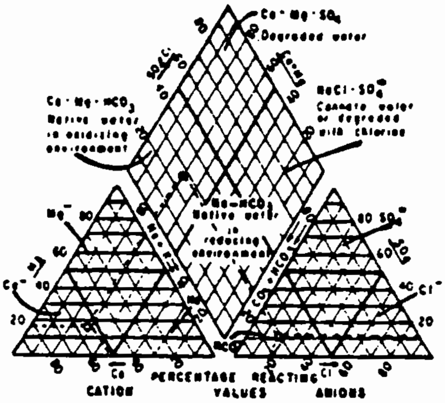
Coarse crushed tailing (<3/4 inch) was conveyed to the top of a heap which eventually covered approximately 120 acres and contained a volume of tailing roughly estimated at 38,000,000 cubic yards. It is not possible to estimate accurately the amount of water which was codisposed with the tailing in this area, but it is estimated to be in the range of 2,500 to 7,000 acre-feet.

In addition to water discharged with the tailing during ore processing operations, water encountered during mining operations in the central portion of the East Pit was pumped from this part of the pit and discharged into alluvium near the pit. Based on recollections of Kaiser Mine personnel, seepage of water into the central portion of the East Pit began in mid-1978, when mining operations at the 735-foot elevation encountered a near-vertical fracture zone. By early 1979, when the entire central portion of the pit had been excavated to the 735-foot level, wet areas had formed across the width of the pit. Subsequent blasting caused the wet areas to dry as the water infiltrated into the blast rubble.

By the first quarter of 1980, the pit bottom had been excavated to an elevation of 720 feet MSL. Water was flowing from several locations along the south wall of the pit. Water was pumped out of the central areas of the pit to a higher elevation in the eastern portion of the pit, where it was discharged onto the land surface and allowed to percolate into the alluvium. During the second quarter of 1980, an attempt was made to excavate to elevation 705 feet MSL, but activity in this part of the pit had to be abandoned because water was interfering with operations, and Kaiser declined to procure the additional pumping equipment required to remove the water. The water level in the pit subsequently rose to a maximum recorded elevation of 752 feet MSL in June of 1982.

The water source for this seepage may have been from tailing stockpiles located just south of the East Pit or groundwater mounded up in this area due to local recharge from water codisposed with tailing. Major ion composition of water from several sources in the Eagle Mountain area are plotted on a trilinear diagram on Figure 42. This diagram indicates a chemical similarity between East Pit pond water and mine process water, rather than with well waters in the area.

Currently, the elevation of the water surface of the pond is about 710 feet MSL. This elevation is within 50 feet of that in all wells within a radius of 7,500 feet of the pond. During January and February 1990, water was pumped from the East Pit pond into a plastic membrane-lined holding basin. Approximately 40,000 gallons of water were pumped from the pond over a 10-day period. Pumping at rates of up to 100 gallons per minute resulted in temporarily lowering the pond water level up to 9 inches. After each episode of pumping, the water level was allowed to recover, and eventually reached its original elevation. Recharge rates of up to about 40 gallons per minute were measured. The fact that pond water levels recovered relatively rapidly after large quantities of water were pumped indicates the existence of substantial amounts of water stored in the fractured bedrock which makes up the sides and bottom of the pond (bank storage).



LEGEND

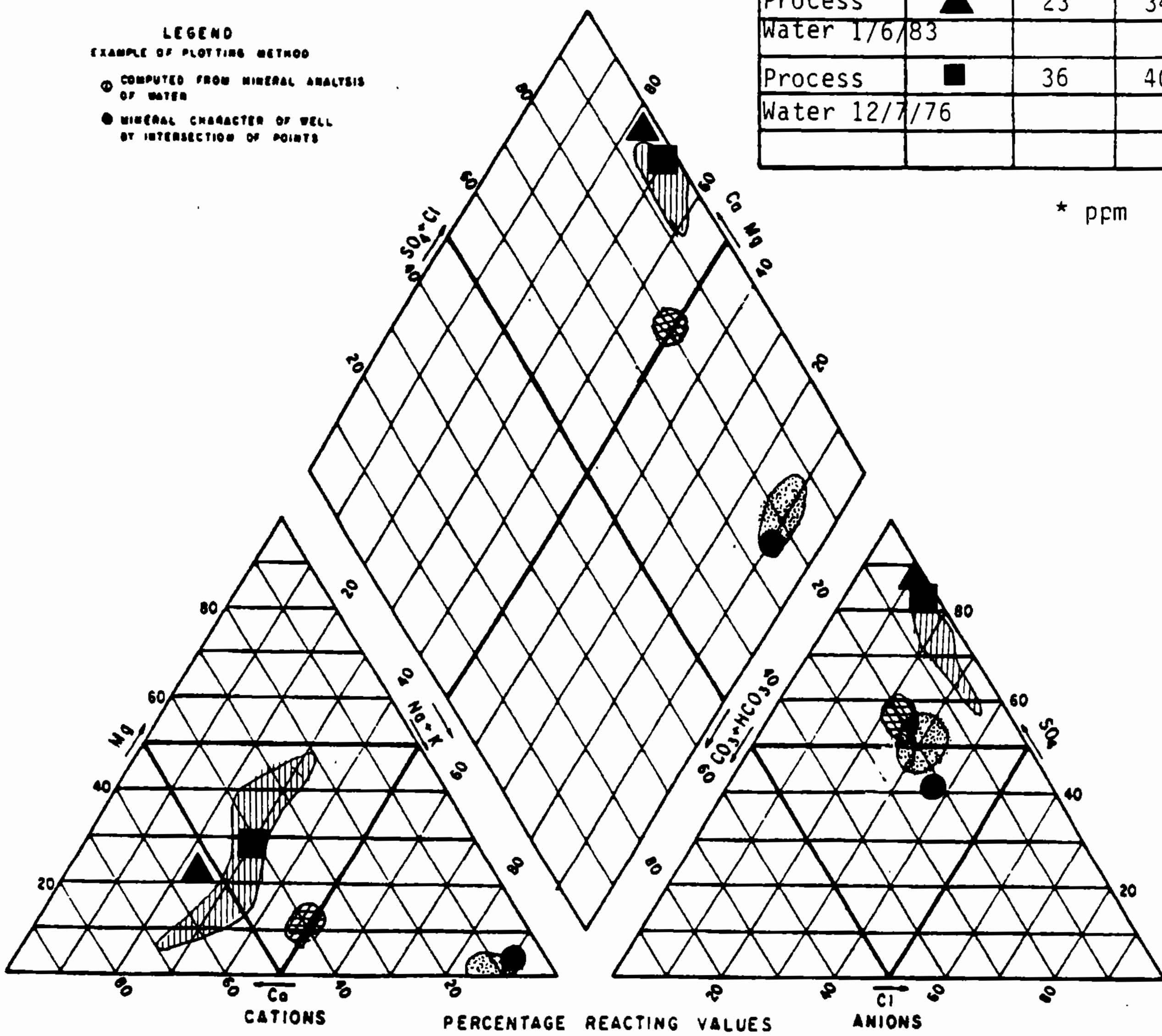
EXAMPLE OF PLOTTING METHOD

⊕ COMPUTED FROM MINERAL ANALYSIS OF WATER

● MINERAL CHARACTER OF WELL BY INTERSECTION OF POINTS

SAMPLES	SYMBOL	* $NO_3^=$	* TDS
Chuck.Wells		4 - 20	550-940
MW-1	●	20 - 28	500-560
Schl. Well		7 - 18	1000-1500
East Pit		69-470	1220-14,000
Process Water 1/6/83	▲	23	3420
Process Water 12/7/76	■	36	4040

* ppm



SOURCE: SCS ENGINEERS

FIGURE 42. TRILINEAR DIAGRAM, GROUND WATER AND PROCESS WATER QUALITY

RECON

Water samples were taken before and after pumping, and samples were chemically analyzed. TDS of the water decreased from 14,000 to 4,700 mg/l, for a reduction to about one third in dissolved solids. This confirmed earlier evidence that water in the pond had become saltier with time, and the inference that the pond has been acting as an evaporative sink. Because of the large quantity of precipitated salts that exist in the soil in the vicinity of the pond from earlier evaporation, it is likely that the 4,700 mg/l measured for the pond water after pumping is higher than that of water stored in the fractured bedrock surrounding the pond, and results in part from dissolution of these precipitated salts.

In accordance with recommendations to the RWQCB contained in the Background Ground Water Quality Monitoring Program report (SCS Engineers 1990), groundwater monitoring is continuing at wells in the immediate vicinity of the East Pit. The purpose of this monitoring is to provide additional background data on local groundwater conditions.

f. Local Groundwater Basin

The local groundwater basin for this project is situated in the northwestern Chuckwalla Valley and adjacent upland areas. The principal aquifer in this area is the Pleistocene alluvium, which consists of fine to coarse sand interbedded with gravel, silt, and lesser amounts of clay (Giessner 1963). This unit is locally cemented with caliche. Well logs from the four Chuckwalla wells (4S/15E-10B, 4S/15E-2D, 4S/15E-2P, 4S/15E-11R) drilled by Kaiser Steel indicate that in this area (about five to six miles east-southeast of the project site), the sands and gravels of the older alluvium extend to a depth of about 300 to 450 feet below ground surface (Figure 43). Below this, the predominantly sand section gives way to clay and shale. Figure 43 also shows the absolute groundwater elevation for each of the wells.

Groundwater has been produced from the older alluvium in Chuckwalla Valley at Kaiser Chuckwalla Well Nos. 1 through 4. Water from these wells has been used for industrial purposes at the Eagle Mountain iron mine and is now being used for nondrinking domestic purposes at the town of Eagle Mountain. Pumping tests conducted at these wells following installation (1964 through 1977) indicate that the wells are capable of producing water at rates between 1,000 and 2,800 gallons per minute (Table 7).

Other geologic units in the northwestern Chuckwalla Valley are not important aquifers because they are either predominantly above the water table or do not consist of sufficiently permeable materials (see subsection c, Groundwater Basins, above).

The upland areas surrounding the valley are underlain principally by bedrock which consists of intrusive igneous and metamorphic rocks. Thin deposits of alluvium are found in stream courses within the uplands as well. The alluvial deposits are generally above the water table and therefore are not water-bearing. Some of the bedrock in the area contains groundwater held in fractures in the rock. It is known from drilling of water wells in other areas of the state

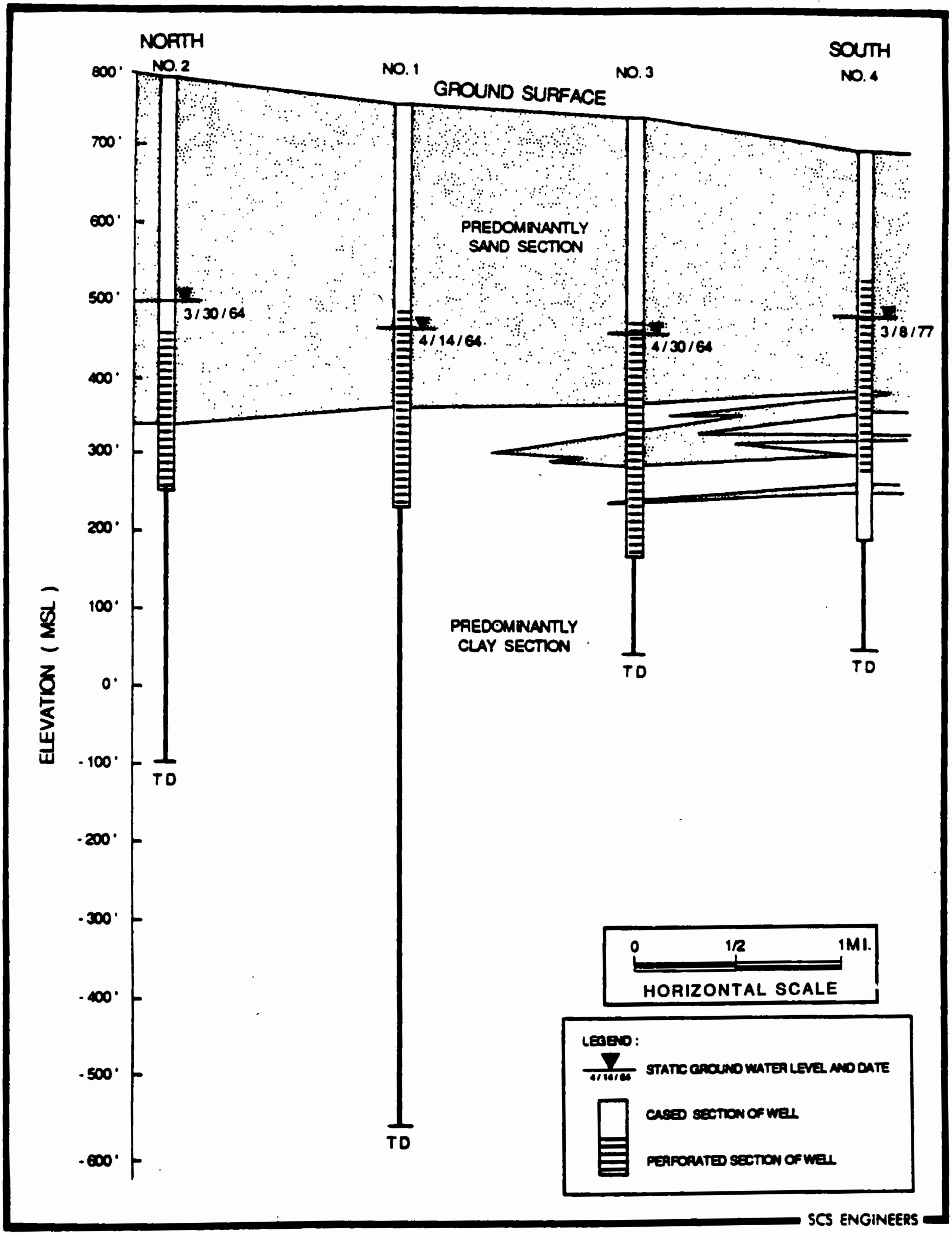


FIGURE 43. WELL LOGS OF KAISER CHUCKWALLA VALLEY WELLS

SOURCE: SCS ENGINEERS

TABLE 7
WELL TEST DATA
KAISER CHUCKWALLA WELLS

Well No.	Pump Rate (gal/min)	Drawdown (feet)	Well Diameter (inches)	Well Length Screened (feet)	Aquifer Interval Screened (feet)	Estimated Permeability (cm/sec)
CW-1* 4S/15E-10B	1,000	75	16	241	121	6.2×10^{-3}
CW-2 4S/15E-2D	2,400	78	16	196	116	1.5×10^{-2}
CW-3 4S/15E-2P	2,800	78	16	289	169	1.3×10^{-2}
CW-4 4S/15E-11R	1,150	32	16	240	180	1.2×10^{-2}

*This well has a tendency to produce sand along with water; as a result, this permeability is probably not as good an estimate of aquifer permeability as the other wells.

that even crystalline rocks (such as granites) can yield sufficient water to wells to provide a usable supply to one or more residences, if the rocks are highly fractured and the fractures are interconnected. In addition, the completion of the Eagle Mountain School well in the town of Eagle Mountain, in 1986, demonstrated that some fractured bedrock in the project area can yield usable quantities of water to wells.

The Eagle Mountain School well was drilled to a depth of 748 feet (Figure 44). This well is located about 2,000 feet south of the East Pit. Bedrock was encountered beginning at a depth of about 200 feet. The well was completed with the screened sections entirely within the bedrock portion of the hole from 475 to 740 feet. The static water level was at an elevation of 779 feet MSL shortly after the completion of the well in February 1985. This fractured bedrock section is capable of yielding water at a rate of 90 to 95 gallons per minute with the present 15-horsepower submersible pump. During testing after well construction, the well was pumped at a sustained rate of 75 gallons per minute for 24 hours, which resulted in a drawdown of 11 feet.

The water-bearing bedrock of this well is located beneath 200 feet of alluvium at the margin of the Chuckwalla Valley. The valley margin is where most groundwater recharge due to runoff is thought to occur. It is unknown whether bedrock within the area of the Eagle Mountains without alluvial cover would yield usable quantities of water over time. In this situation, recharge probably occurs at a very low rate due to the fact that there is little or no overlying alluvium to hold water derived from precipitation. The school well indicates, however, that in some areas the bedrock is fractured sufficiently to provide groundwater storage capacity and pathways for water to move.

g. Water Wells in Project Vicinity

To determine the points at which groundwater is withdrawn for use in the northwestern Chuckwalla Valley and their distances from the project site, a canvass of well locations was performed. Locations of known water wells within 10 miles of the project site are shown on Figure 45. Descriptive information on these wells is presented in Appendix C.

The nearest wells to the project site are the Eagle Mountain School discussed above and Monitoring Well Nos. 1, 2, and 3 (MW-1, MW-2, and MW-3). MW-1 (3S14E-36H) is located about 2,000 feet east of the East Pit. MW-1 was drilled and completed during April and May of 1989, at the direction of Mine Reclamation Corporation. The purpose of this well is to provide one of four groundwater monitoring points to determine background water quality in the vicinity of the project site. Quarterly water quality monitoring activities for the site are described in the subsection on background groundwater quality monitoring below.

MW-1 was drilled to a total depth of 400 feet through alluvium consisting of fine to coarse sand, gravel, silt, and a minor amount of clay. The log prepared by geologists at the site is also

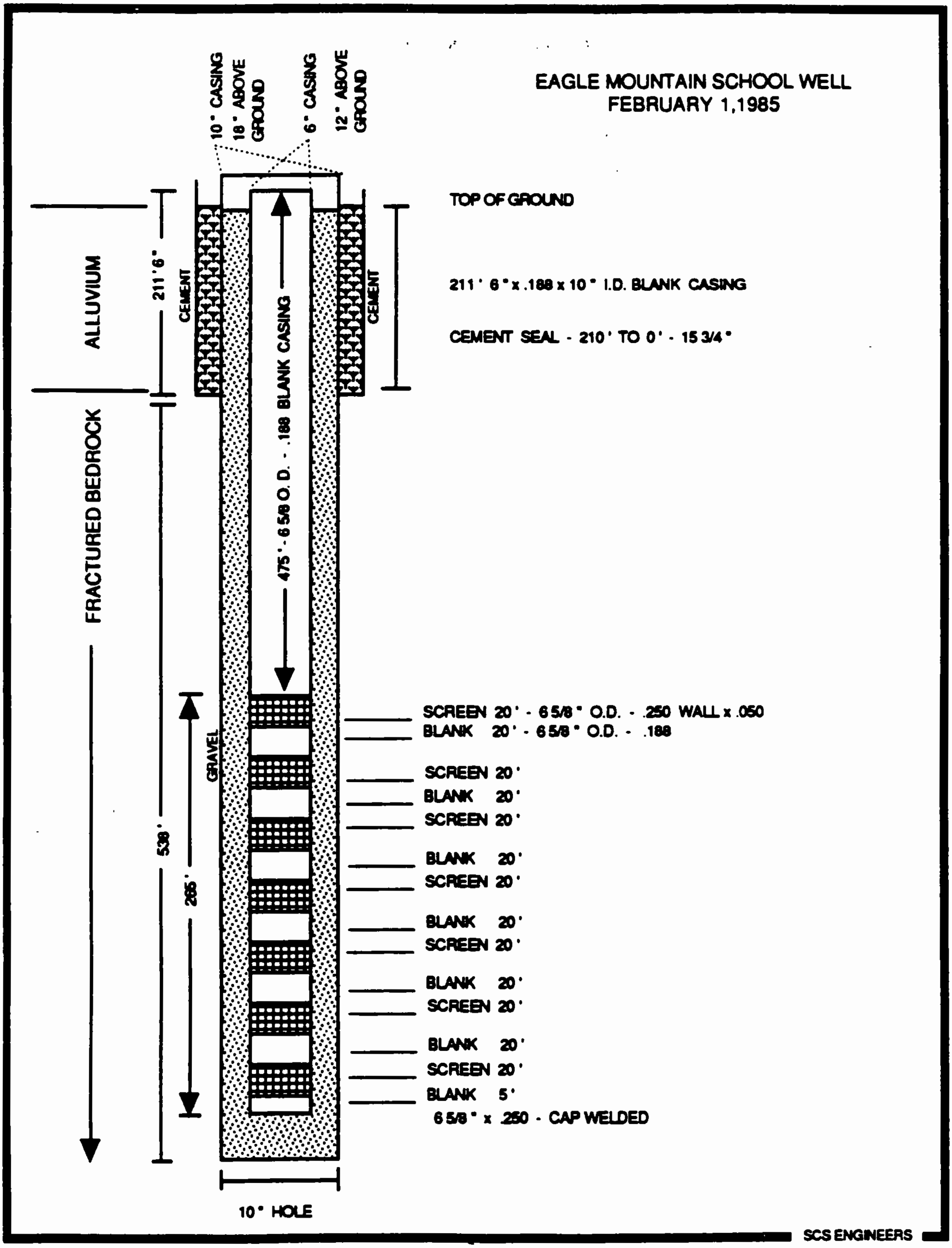


FIGURE 44. WELL LOG OF EAGLE MOUNTAIN SCHOOL WELL

SOURCE: SCS ENGINEERS

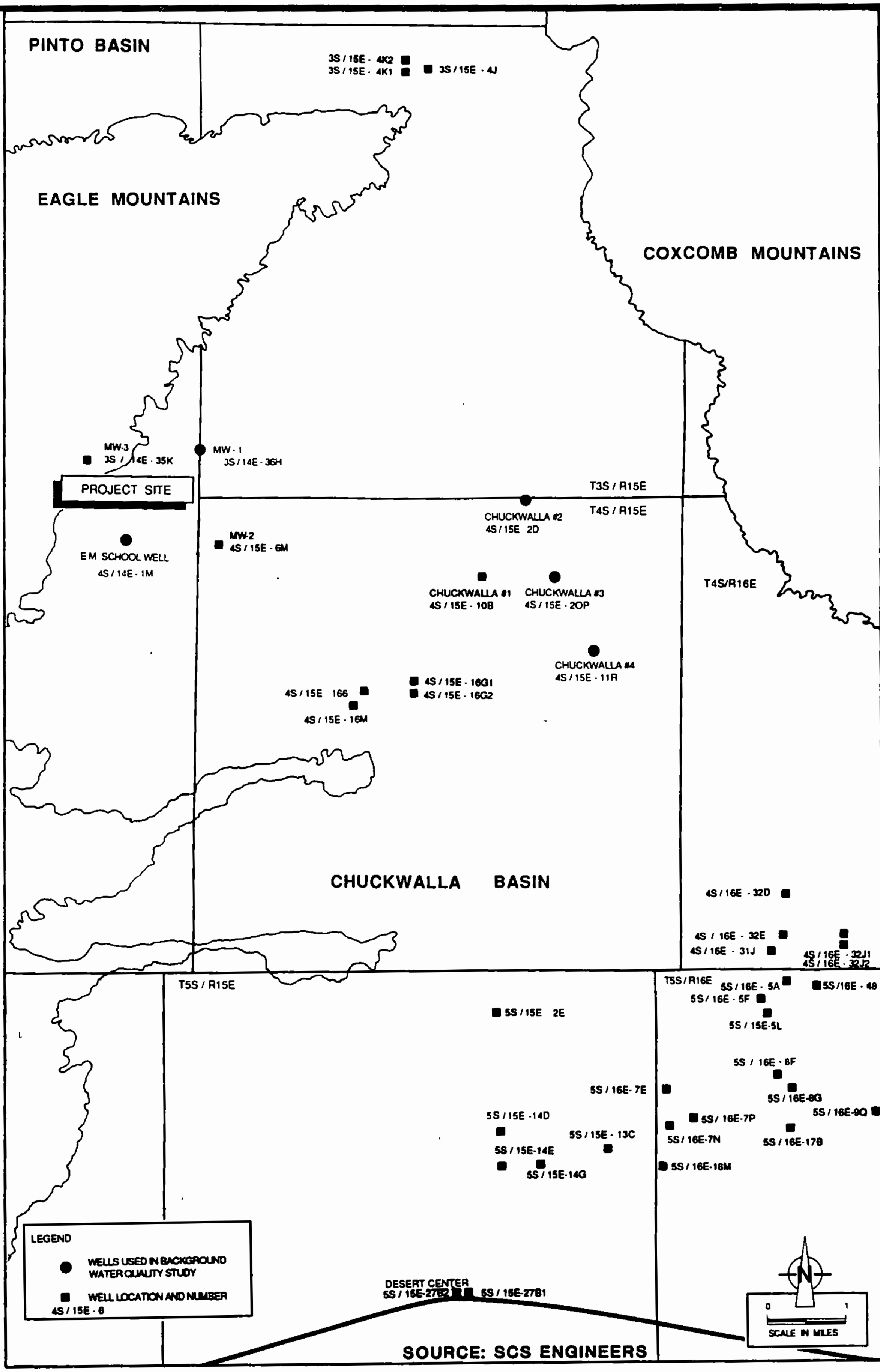


FIGURE 45. WELL LOCATIONS WITHIN 10 MILES OF THE PROJECT

RECON

reproduced in Appendix C. The well was cased with five-inch-diameter Schedule 80 PVC to 385 feet, with the lowermost 60 feet of casing perforated (0.020-inch machine-cut slots). The static water level elevation at MW-1 was 717 feet MSL on September 26, 1989.

During March and April 1990, two additional groundwater monitoring wells were installed in the Eagle Mountain area. MW-2 is located approximately 5,000 feet southeast of the East Pit, and MW-3 is located within the western portion of the East Pit.

MW-2 (4S15E-6M) was initially drilled using the dual-wall reverse circulation air rotary method to facilitate logging of the geologic units penetrated. The 5-inch-diameter pilot hole was enlarged to 10 inches using a mud rotary system. Drilling penetrated only alluvium consisting of fine to coarse sand, gravel, silt, and some clay (see Appendix C). MW-2 was constructed of 61 feet of 4-inch-diameter stainless steel screen and stainless/ carbon steel blank casting, reaching a total depth of 455 feet. After development, static water level was measured at 693 feet MSL. Water sampled from this well had TDS of 860 to 930 mg/l; water chemistry, in general, resembled that of other alluvial wells (being of a sodium sulfate type), although the relative concentration of calcium and sulfate is slightly higher in MW-2, while the relative concentration of sodium and bicarbonate is slightly lower than in the other nearby alluvial wells. Fluoride concentration (3.2 to 4.6 mg/l) is intermediate between that of the Kaiser Chuckwalla wells and the wells closer to the mine site.

MW-3 (3514E-35L) was drilled using a reverse circulation air rotary method with a downhole percussion hammer, drilling an 8-inch-diameter hole to a depth of 380 feet. Drilling penetrated primarily metamorphic rocks that consisted of quartzite, meta-arkose, and calc-silicate hornfels; the iron ore which is within the metamorphic sequence was encountered between depths of 90 to 150 feet (see Appendix C). MW-3 was constructed of 61 feet of 4-inch-diameter stainless steel screen and stainless/carbon steel blank casing, reaching a total depth of 350 feet. After development, static water level was measured at 757 feet MSL. Water sampled from this well had TDS of 1,600 mg/l; water chemistry is of sodium and calcium sulfate type and, in general, resembles that of the school well, although the relative concentration of sulfate is higher in MW-3 while the relative concentration of sodium is lower. Proportions of major ions are similar to those measured in the East Pit pond. Fluoride concentration (0.7 to 1.6 mg/l) is somewhat lower than that of the school well.

h. Background Groundwater Quality Monitoring

Background water quality characterization is necessary to meet the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 15 (Section 2595 [g] [7]). These regulations are administered by the Regional Water Quality Control Board. To satisfy the regulations, a program for systematic collection of data on groundwater quality was initiated in June, 1989. The program for background groundwater quality monitoring in the project area was based on that proposed in an October, 1988, report by SCS Engineers and approved by the Colorado River Regional Water Quality Control Board.

The monitoring program was designed to characterize groundwater quality in the vicinity of the project site. The proposal called for the drilling of two 400-foot-deep exploratory borings, one located about 2,000 feet east of the East Pit (downgradient) and one located about 3,000 feet southwest of the pit (upgradient). Two upgradient holes were subsequently drilled, one to 230 feet and one to 400 feet. Both of these holes, drilled in igneous and metamorphic bedrock, failed to encounter groundwater. One downgradient hole was drilled to 400 feet in alluvium and encountered groundwater at approximately 330 feet. This hole was completed as a monitoring well (MW-1) in May, 1989. The logs of these borings are shown in Appendix C.

Following the installation of MW-1, the background water quality monitoring program was instituted. The program consists of quarterly groundwater samplings for common dissolved groundwater constituents, heavy metals, and volatile organic compounds from the following downgradient wells:

1) Monitoring well MW-1 (3S/4E-36H), located approximately 2,000 feet east of the East Pit.

2) Eagle Mountain School well (4S/14E-IM), located approximately 4,000 feet south of the pit.

3) Kaiser Chuckwalla Well Nos. 2 (4S/15E-2D), 3 (4S/15E-2P), and 4 (4S/15E-11R), located approximately five miles east-southeast of the East Pit.

The locations of these wells are shown on Figure 45.

Water samples are tested for the following parameters:

1) pH, specific conductance (electrical conductance [EC]), and temperature in the field.

2) Volatile organic compounds by Environmental Protection Agency Method 524.2.

3) General minerals, including TDS, alkalinity, carbonate, bicarbonate, chloride, fluoride, sulfate, nitrate, calcium (Ca), copper (Cu), iron (Fe), manganese (Mn), magnesium (Mg), potassium (K), sodium (Na), and zinc (Zn).

4) Metals by atomic absorption or induction coupled plasma analysis, including antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), mercury (Hg), molybdenum (Mo), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), and vanadium (V).

5) Other parameters, including chemical oxygen demand (COD), total organic carbon (TOC), total organic halides (TOX), ammonia, and cyanide.

Following four quarters of monitoring, the results of the data gathered were statistically analyzed and interpreted and a discussion of data included in a report submitted to the RWQCB.

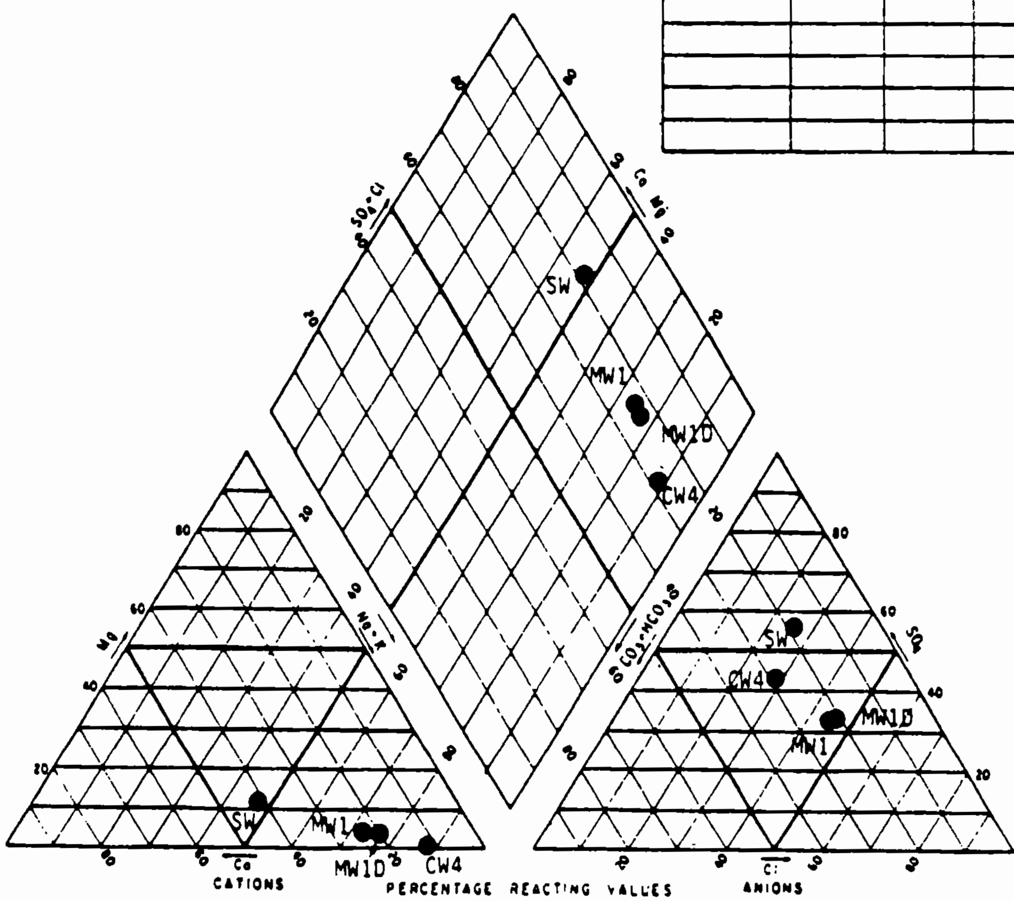
Wells were sampled in June, September, and December, 1989, and in March of 1990. Water quality data indicate that the groundwater is generally of the sodium sulfate type. Water quality from the two Kaiser Chuckwalla wells, located in geologically similar areas about two miles apart, are comparable. Major ion composition of water from MW-1 is similar to that of the Chuckwalla wells. Water from the Eagle Mountain School well is similar to that of the other wells in anionic composition, but contains a lower proportion of sodium and a greater proportion of calcium. These data are shown graphically on Figure 46, which indicates the major ion concentrations in the four wells. TDS content of the water ranges from 510 to 1,000 mg/l and is highest in the Eagle Mountain School well and lowest in MW-1. Laboratory pH ranges from 6.6 to 8.3; pH is lowest in MW-1 and highest in Kaiser Chuckwalla Well No. 4. Temperature of groundwater is relatively high, with wells closest to the project site averaging nearly 32 degrees C and Kaiser Chuckwalla wells averaging about 30 degrees C.

The only chemical species detected in concentrations greater than national primary drinking water standards was fluoride, which was above these limits in all wells except MW-1. Fluoride, whose presence renders much of this area's water unfit for drinking without prior treatment, ranged from 0.7 to 11 mg/kg in the four wells. Fluoride concentration was lowest in MW-1 and highest in Kaiser Chuckwalla Well No. 4.

No metals were found at concentrations above national primary drinking water standards. Measurable COD (an indication of the quantity of organic matter present) was found only in the Eagle Mountain School well in June 1989 and MW-1 in September. The school well had the highest concentration of TOC in June, and none of the four wells indicated any measurable organic carbon in September. No volatile organic compounds have been detected in any of the four wells.

Overall water quality in the four wells is not generally considered to be high. In addition to generally high fluoride concentration, TDS levels are all above 500 mg/l (the maximum recommended level in the national secondary drinking water standards). In addition, sulfate concentration equaled or exceeded the national secondary standard of 250 mg/l in all wells but MW-1 on both sampling dates and in Chuckwalla Well No. 4 in September 1989. Concentrations of iron and manganese were above national secondary drinking water standards in MW-1 in June and in both MW-1 and the school well in September. The laboratory results for these two chemical species may represent suspended sediment as well as dissolved iron and manganese.

Well	pH	Fl⁻	TDS/TH
MW1	8.0	0.60	500/84
MW1D	8.1	0.68	520/94
SW	7.6	2.0	960/378
CW4	8.2	11.0	650/54



Wells sampled December 12 and 13, 1989.

SCS ENGINEERS

FIGURE 46. TRILINEAR DIAGRAM INDICATING RELATIVE CONCENTRATION OF MAJOR IONS AT MW-1, EAGLE MOUNTAIN SCHOOL WELL AND CHUCKWALLA WELL NUMBER 4

SOURCE: SCS ENGINEERS

i. Local Water Quality

To provide additional data on water quality in the local groundwater basin, a program was instituted for sampling and analyzing water from irrigation, domestic, and other water production wells in the northwestern Chuckwalla Valley. This program was first implemented during August, 1989. The data provide a supplement to background water quality data being obtained as described in the previous section.

Samples were taken from selected wells, with the well owner's permission, for general minerals analysis. To date, seven wells have been sampled. In addition, previous water quality analyses have been obtained from published and unpublished records of the California Department of Water Resources, the Lower Colorado River RWQCB, the Riverside County Department of Health, the U.S. Geological Survey (U.S.G.S.), Kaiser Steel Resources, and other sources. The previous water quality analyses and laboratory reports on recent water quality analyses have been reproduced in Appendix C.

Most untreated groundwater in the northwestern Chuckwalla Valley is of a quality which is satisfactory for irrigating the common types of crops grown locally and for domestic uses besides drinking. Locally, groundwater may contain levels of boron or sodium which are too high for irrigation of some crop species.

Groundwater from almost all areas of the northwestern Chuckwalla Valley contains fluoride concentrations which are above the national primary drinking water standards. These regulations specify a temperature-dependent maximum concentration of fluoride which is between 1.4 an 2.4 mg/l. This concentration is 1.4 mg/l for the air temperatures experienced in the Chuckwalla Valley. Nearly all wells in the northwestern Chuckwalla Valley yield water with greater than 1.4 mg/l of fluoride. Other dissolved constituents of the local groundwater, including trace elements, are generally below the maximum acceptable levels specified in the primary drinking water standards. However, groundwater quality in most of the northwestern Chuckwalla Valley is not suitable for drinking purposes without treatment to reduce fluoride concentrations. TDS concentrations, which were found to range from 430 to 1,100 mg/l in recent water analyses, average about 700 mg/l. Water with TDS concentrations between 500 and 1,000 mg/l is considered to be of lower quality for drinking than water with less than 500 mg/l TDS. The sulfate content of Chuckwalla Valley water is relatively high (average about 210 mg/l). Sulfate in water can impart a bitter taste, and for those not accustomed to drinking it, water high in sulfate salts can act as a laxative.

There are several differences in water chemistry between wells tapping the alluvial aquifer and those completed in bedrock aquifers. Water sampled from bedrock in the vicinity of the Eagle Mountain Mine has TDS concentrations generally above 950 mg/l, while alluvial water is generally below this level in the vicinity of the project site. Bedrock water tends to be proportionately higher in calcium, magnesium, and sulfate, and lower in sodium. Fluoride concentrations tend to be lower in wells located near the mine area than in those located closer to the central axis of the northwestern Chuckwalla Valley. However, this does not differentiate bedrock from alluvial water. Temperatures of water produced from bedrock wells tend to be slightly higher than those of water from alluvial wells, although all groundwater from the northwestern Chuckwalla Valley is relatively high in temperature. The differences in water chemistry may indicate that the source of bedrock and alluvial water differs, and that there is only limited connection between groundwater from the two sources.

j. Occurrence and Movement of Groundwater

Depth to groundwater in the northwestern Chuckwalla Valley has been measured from about 500 feet below ground level in the Eagle Mountain School well south of the East Pit and to as shallow as 60 feet in the Desert Center Airport area. Water level elevations range from an estimated 800 feet MSL at the boundary between the Chuckwalla Valley and Pinto Basin to below 500 feet MSL in the airport area.

A regional contour map of the upper surface of groundwater is presented in Figure 47. Generalized groundwater flow directions are indicated on the map by arrows. Groundwater flow is generally from north-northwest to south-southeast within the valley. As one approaches the Desert Center area, flow direction shifts to a more easterly direction.

Based on water level elevations measured at groundwater monitoring wells and at the East Pit pond, a map of the groundwater surface can be drawn for the area near the East Pit (Figure 48). It appears that there is a depression in groundwater surface centered on the East Pit pond and a reversal of the generally eastward sloping regional groundwater surface to the east. Excavation of the central portion of the pit to a depth below the upper surface of the groundwater and groundwater discharge at this point is the most likely cause of the depression in the potentiometric surface. As a result of the depression, the groundwater surface slopes westward and groundwater flow is westward under portions of the eastern half of the pit.

Groundwater gradient is estimated from the map to average about 0.01 foot/foot in the area between the East Pit and the Kaiser Chuckwalla wells. Permeability (hydraulic conductivity) of the water-bearing valley alluvium is estimated to be 1×10^{-2} cm/sec from the grain size and textural characteristics of the sediment. Given this assumption, and the average groundwater gradient, average net velocity of water moving laterally through the alluvial aquifer can be calculated by multiplying the hydraulic conductivity by the gradient. The result is a velocity of 1×10^{-4} cm/sec, or about 100 feet (30 meters) per year. Actual velocity in the Eagle Mountain project area is probably less because of a locally flatter groundwater gradient.

Direction of groundwater movement within granitic and metamorphic bedrock beyond the immediate vicinity of the East Pit cannot be estimated accurately with data currently available, although it probably conforms approximately to surface drainage patterns. The permeability

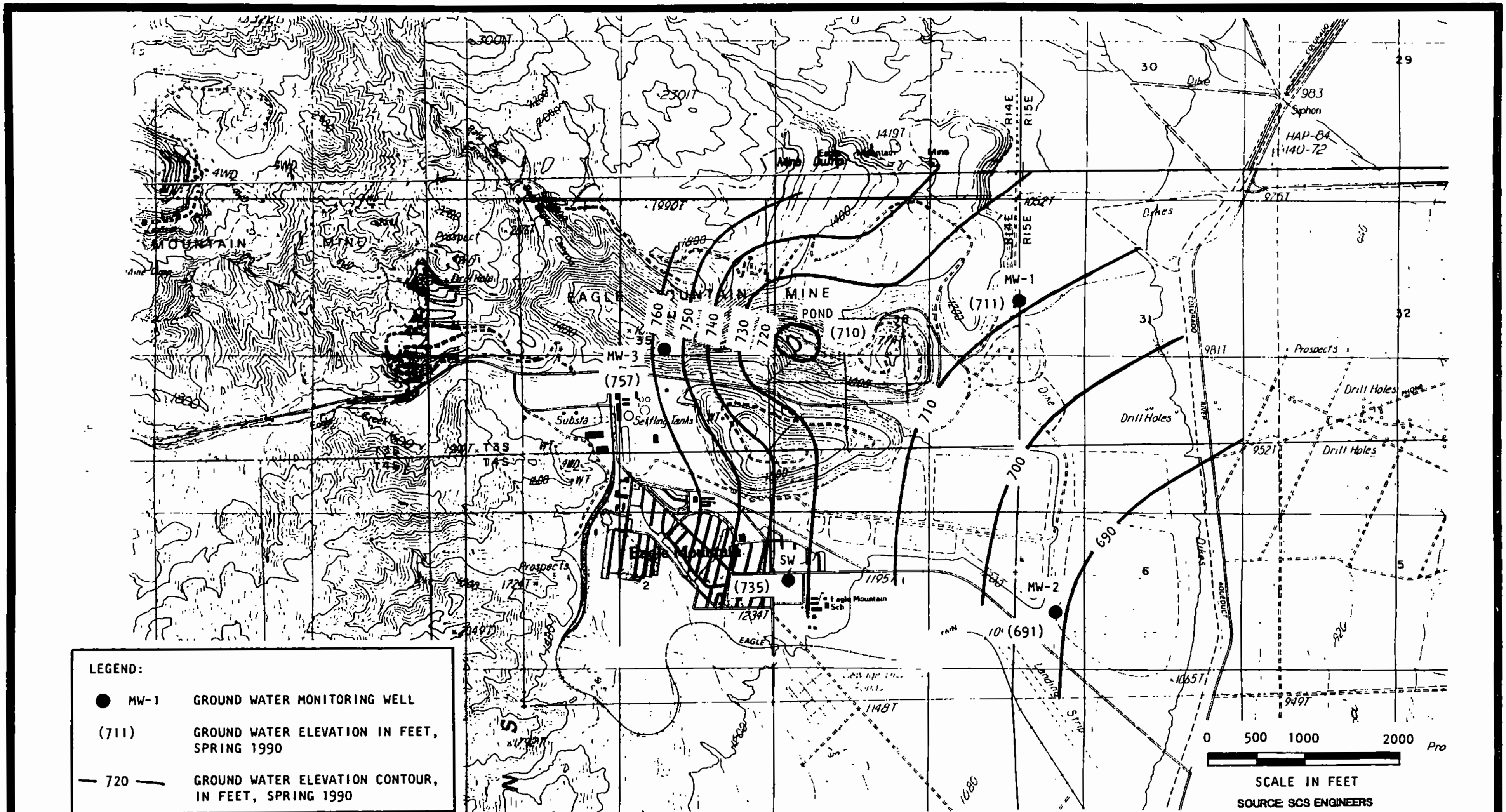


FIGURE 48. GROUNDWATER LEVEL ELEVATIONS, 1990

of the unfractured bedrock is very low (the bedrock underlying the East Pit ranges from 1×10^{-9} to 1×10^{-11} cm/sec based on lithology), and bedrock fractures most likely control the movement of water. Permeability has been estimated at 1.8×10^{-3} cm/sec for the Eagle Mountain School well, although this value seems too high to be representative of average bedrock permeability. Porosities of bedrock are difficult to estimate but are expected to be in the range of 1 to 10 percent or 1×10^{-6} cm/sec.

2. Surface Water Quality

Surface drainage in the area of the project site is generally towards the east. Drainage within the central portion of the northwest Chuckwalla Valley is towards the southeast, in the direction of Palen Dry Lake. Drainage is more completely described in the section of existing drainage conditions.

There are no permanent, natural bodies of surface water in the Chuckwalla Valley. Surface drainage of precipitation follows heavy rains, but after the cessation of rainfall, surface water generally disappears in a short period of time due to percolation and evaporation.

No year-round springs have been reported in the northwestern Chuckwalla Valley. A number of springs having intermittent flow do exist in the mountains which surround the northwestern Chuckwalla Valley. Information on these springs is summarized in Table 8.

One prominent artificial surface water body exists in the vicinity of the project site. This is the MWD Colorado River Aqueduct, which lies, at its nearest point, one mile east and one-quarter mile north of the East Pit. The MWD aqueduct is oriented approximately north-south in the area east of the project site; water flow is from north to south. From about one-quarter mile north of the East Pit to the MWD Eagle Mountain Pumping Plant (about four miles south of the project site), the aqueduct is covered.

Other surface water bodies within 10 miles of the proposed project site include holding ponds at the MWD Eagle Mountain pumping station, a small industrial pond at Eagle Mountain (not the wastewater facility), and the artificial lakes at the Lake Tamarisk community (located about nine miles southeast).

3. Groundwater Use and Water Supply

Water uses in the northwestern Chuckwalla Valley include domestic, agricultural, and industrial. The Kaiser Chuckwalla wells have, in the past, been used principally for industrial water supply. From 1973 to 1979 Kaiser pumped approximately 3,750 to 4,000 acre-feet per year from their Chuckwalla wells. In 1980 Kaiser's water use declined and only 3,245 acre-feet was pumped from the Chuckwalla wells. In 1981 as Kaiser business declined, water use from

TABLE 8
INFORMATION ON SPRINGS
NORTHWEST CHUCKWALLA VALLEY

Name/Location*	Elevation (feet)	Dry/Flowing
Eagle Tank 3S/13E-23	2,040	
Buzzard 4S/14E-16	2,010	Dry (3/88)
Unnamed 4S/14E-16	2,400	
Hayfield Summit 5S/14E-19	1,900	
Long Tank 6S/15E-2	1,190	Flowing (6/61)

*Location: Township/Range-Section.

these wells fell again to 3,006 acre-feet and in 1982 to 1,574 acre-feet. The Eagle Mountain School well was used previously for domestic water supply, although it is not being pumped at the present time.

Currently, MW-1, MW-2, and MW-3 are used only for groundwater quality monitoring. Most of the other water wells within 10 miles of the project site are used either for domestic or irrigation supply. One exception is the Southern California Gas Company (SCGC) well near the Desert Center Airport, which is used to supply cooling water for gas compression equipment.

Chuckwalla Valley groundwater use was the subject of a study by John Mann (1986). The study indicated that potential use of 23,000 acre-feet of groundwater from the northwestern Chuckwalla Valley during 1986 (Table 9). Mann's study showed that this rate of water use would result in an overdraft condition (more water being withdrawn than being added through recharge) for the groundwater basin. The greatest volume of water at this time was being used for irrigation.

Based on information in the Mann study, yearly inflow into the northwestern portion of the Chuckwalla Valley (area west of a north-south line between the southwestern tip of the Palen Mountains and the central Chuckwalla Mountains), is expected to consist of approximately (a) 2,500 acre-feet of underflow to the south from the Pinto Basin, (b) 1,700 acre-feet of underflow to the east from the Hayfield Basin, and (c) an unknown amount of underflow to the south from the Cadiz Basin. Based on the relative size of each basin, it is estimated that underflow from the Cadiz Basin should at least equal that from the Pinto Basin; it is estimated, therefore, that 2,500 acre-feet of underflow occurs yearly from the Cadiz Basin.

Mann also states it has been suggested that 5 to 10 percent of the rain falling on watersheds tributary to the Chuckwalla Valley contributes to the ground water in the basin. Conservatively estimating that 5 percent of the rain falling in the Chuckwalla Valley and surrounding drainage in an average year contributes to ground water replenishment, this amounts to 5,540 acre-feet of water annually. The total inflow to the basin is thus estimated at 12,240 acre-feet per year.

Since 1986, the acreage being used for agriculture has decreased, so that overall water use should not be greater than the amounts estimated in 1986. If it is conservatively assumed that overall water use has remained approximately constant since the time of Mann's study, this would suggest that the northwestern Chuckwalla Valley may still be in an overdraft condition of 10,760 acre-feet per year.

The Mann study also indicated that the water level in one well in an area of concentrated agricultural activity in the northwestern Chuckwalla Valley experienced a drop of 110 feet during a five-year period, beginning in 1981. More recent information from the SCGC indicates that the drop may actually have been closer to 130 feet. Most of the drop in the SCGC

TABLE 9
POTENTIAL 1986 WATER USE

Use	Rate	Acre-feet
Irrigated Crops		
Jojoba	4,005 acres @ 2.2 acre-feet/year	8,811
Jojoba with asparagus	457 acres @ 4.6 acre-feet/year	2,102
Asparagus	1,309 acres @ 8.3 acre-feet/year	10,865
Citrus	14 acres @ 4.5 acre-feet/year	63
Dates	14 acres @ 8.0 acre-feet/year	112
Vines	5 acres @ 4.5 acre-feet/year	23
Pasture	10 acres @ 6.4 acre-feet/year	64
Total		22,040
Tamarisk Lake development		865
Gas company		5
Miscellaneous domestic		50
TOTAL		22,960

well occurred between 1981 and 1985, when the water levels dropped by over 100 feet. Water in this well dropped only about five feet between 1986 and 1988.

There is an indication that water level change in the SCGC well since 1980 is not typical of the Chuckwalla Valley. Data on longer-term water level changes from Kaiser Chuckwalla Well Nos. 1, 2, and 3 indicates an average drop in water level of 1.6 feet per year between 1964 and 1989. There was, in fact, a net rise in water level of 1.5 feet per year in Chuckwalla Well No. 4 during the period of 1977 to 1989.

Estimates of the total usable water reserves in the Chuckwalla Valley vary. These reserves were estimated by Mann to be one million acre-feet, 100 feet of saturated sediments and a storage coefficient of 15 percent. It is not clear to which area the Mann estimate applies. A U.S.G.S. estimate for the entire Chuckwalla Valley is 15 million acre-feet assuming a 300-foot thickness and a 10 percent storage coefficient (Koehler and Mallory 1981; Skineman 1989).

Based on the relative proportion of total valley area located in the northwestern Chuckwalla Valley, this portion of the valley is assumed to contain 40 percent of total water reserves. This would indicate, using the U.S.G.S. estimate, that 6 million acre-feet of groundwater reserves were located in the northwestern Chuckwalla Valley.

B. Public Health and Safety

Generally, potential effects related to public health at landfills are common to all landfills. The following discussion is based on technical data and background information provided by SCS Engineers. This information is taken from conditions known generally to occur at landfills. It is important to note that these conditions do not exist currently on the site; however, they are issues related to the proposed landfill.

1. Hazardous Wastes in the Solid Waste Stream

Items such as nail polish, paint, cleaning products, insecticides, automotive and appliance batteries, aerosol cans, and other common household goods contain hazardous constituents which are not authorized for disposal at Class III nonhazardous solid waste landfills. Regulations exist at the federal and state level which control hazardous materials and wastes and prevent their improper disposal. State law and regulations (Chapter 15 of Division 3 of Title 23 of the California Code of Regulations) regulate the disposal of four types of wastes including hazardous waste, designated wastes, nonhazardous solid waste, and inert wastes. Because of these regulations, large quantities of hazardous materials and wastes are not typically found in the municipal solid waste stream.

This project will accept only nonhazardous solid waste and inert wastes. As defined in Chapter 15, nonhazardous solid waste consists of garbage, trash, refuse, paper, rubbish, industrial waste, ashes, appliances, food waste, and other materials provided that such wastes do not contain wastes which must be managed as hazardous waste or wastes with soluble pollutants in concentrations that exceed water quality objectives.

Most programs which sample and analyze solid waste are designed to identify the amount of recyclable material present or the energy content of combustible material. They are not designed to identify the presence or amount of hazardous wastes in the refuse. A few studies have been performed, however, which address this question. Monitoring programs at Los Angeles County landfills have confirmed the presence of unauthorized materials in nonhazardous domestic and commercial refuse.

In 1979, the Los Angeles County Sanitation Districts initiated a program which estimated the hazardous content of municipal wastes at the Mission Canyon Sanitary Landfill. Of the 29 household/commercial loads sampled, less than 0.2 percent (by weight) were found to be hazardous. A hand-sorting program conducted by the City of Los Angeles Bureau of Sanitation indicates the percentage of unauthorized materials in household refuse to be 0.3 percent (by weight). These measurements include the weight of the containers in which these materials were found. Results from the County's existing monitoring program, in effect since 1984 at the Puente Hills Landfill, show that the hazardous fraction of the total waste stream is less than

200 parts per million (0.02% by volume). It should be noted that this program monitored refuse which did not pass through a materials recovery facility and no recycling occurred prior to the refuse being placed in the waste stream.

2. Landfill Gas and Landfill Gas Condensate

a. Landfill Gas

LFG is produced during the natural biological decomposition of organic material contained in deposited solid wastes. In a landfill environment, buried organic materials (such as paper wastes, yard debris, and food wastes) initially undergo aerobic decomposition. As oxygen contained in the refuse is depleted, anaerobic decomposition processes commence, usually within a few months of waste burial. The production of methane gas (a principal component of LFG) by methanogenic bacteria usually begins shortly thereafter and continues for many years. In addition to methane, the LFG which results from anaerobic decomposition contains carbon dioxide, residual amounts of nitrogen and oxygen, and other trace gases. The primary concerns associated with LFG are its potential explosive hazard, toxic gas constituents, and generation of LFG condensate.

Trace constituents that may be present in LFG include hydrogen sulfide, carbon monoxide, ammonia, and volatile organic compounds (VOCs) such as chlorinated, aromatic, and other hydrocarbons. These compounds are typically present in the raw gas stream in the parts per million or parts per billion by volume range. Whereas methane, carbon dioxide, and nitrogen are nontoxic, some of the trace LFG constituents can be extremely harmful, given sufficiently high concentration and long exposure.

The vicinity of the proposed landfill is primarily underlain by plutonic igneous and metamorphic bedrock. Fractures in the bedrock could provide a pathway for lateral gas migration. The two major sets of fractures in the East Pit trend approximately east/west and approximately north-northeast/south-southwest. If LFG were to migrate away from the landfill mass, it is expected that it would move through bedrock in the directions parallel to the fracture orientation. The easternmost portion of the East Pit is underlain by alluvium with relatively high permeability which could allow lateral migration should LFG escape from the landfill. Any structures in the area could trap potentially migrating LFG and its methane component causing an explosion hazard.

b. Landfill Gas Condensate

Gas extracted from a landfill is normally saturated with moisture. During collection, the landfill gas undergoes a temperature decline as it moves through pipes close to the ground surface, followed by compression prior to combustion. During these processes, the moisture condenses and accumulates at low spots in the collection pipes or in specially designed sumps. This accumulated moisture is known as LFG condensate.

LFG condensate is a two-phase liquid containing an aqueous phase and an organic phase. The organic phase often separates as a float. In general, the aqueous phase is mostly water with trace organic compounds. The organic phase, which typically comprises 1-5 percent (by volume) of the total mixture, consists primarily of hydrocarbons (organic sulfurs, halogens, benzene, toluene, and other organics with a molecular weight of less than 100), other compounds identified by the EPA as priority pollutants, and trace moisture (SCS Engineers 1987).

There is little published information on the chemical characteristics of condensate. One study (Briggs and McLaughlin 1988) presents the results of analyses of condensate samples obtained at four landfills with operating LFG recovery systems (two of which are located in California). The samples were analyzed for pesticides, polychlorobiphenyls (PCBs), and priority pollutant metal and organic compounds. No pesticides, PCBs, or priority metals were detected in the samples.

c. Applicable Regulations

Subtitle D of the Resource Conservation and Recovery Act (RCRA), and its regulations in 40 CFR 258, currently being drafted by the EPA, is to assist the states in developing environmentally sound methods for virtually all aspects of solid waste disposal, including LFG control. In its currently proposed form, the revised Subtitle D contains guidelines for landfill owners/operators to monitor LFG migration and air emissions and to develop contingency action plans should monitoring results indicate potential hazards. These provisions generally follow regulations already in effect in California (discussed below).

Regulations published for Subtitle C of RCRA (40 CFR 261) require that LFG condensate or leachate be treated as a hazardous waste if they exhibit specific criteria for ignitability, corrosivity, reactivity, or toxicity. If determined to be hazardous, they must be managed in accordance with regulations governing hazardous wastes (40 CFR 264). That is, tanks or sumps used to collect the material must be designed and operated to accommodate secondary containment, spill prevention, overfill, and corrosion protection. Aqueous, nonhazardous components of LFG condensate or leachate need not be handled as hazardous wastes.

Title 14, Division 7, Chapter 3, of the CCR (State Minimum Standards for Solid Waste Disposal) is enforced by the California Integrated Waste Management Board and its designated Local Enforcement Agency. In Riverside County, the LEA for landfill compliance is the County Department of Health. The Minimum Standards control most aspects of the design, operation, and closure of all landfills. Regarding LFG control, the Minimum Standards contain identical limits on subsurface and facility structure methane concentrations as embodied in RCRA Subtitle D.

Title 22 of the CCR contains the enforcement regulations which govern hazardous wastes. Division 4 of these regulations governs the classification and handling of hazardous wastes and, in some respects, is more stringent than the RCRA requirements noted above. Specifically, LFG condensate or leachate must be treated as a hazardous waste if they meet the specific criteria defined in RCRA; contain chemical constituents listed in the state regulations as being hazardous (e.g., benzene, toluene, and vinyl chloride); or exhibit certain toxicity criteria.

Title 23, Division 3, Chapter 15, of the CCR governs discharges of waste to land. These regulations have been established to preserve the quality of the state's surface and ground waters, particularly as they may be affected by waste disposal operations. They apply to the overall landfill operation and would be enforced by the Regional Water Quality Control Board.

Also at the state and local level, regulations exist which require the installation of LFG collection and control systems (not merely monitoring and a contingency plan as in federal regulations). This procedure is required in Rule 1150.1 of the South Coast Air Quality Management District and is discussed in detail in Section B.4., Air Quality.

3. Fires

Fires at the landfill surface are caused when combustible refuse, vegetation, and/or litter become ignited from any of the following sources:

a. The tipping of hot or smoldering loads, or loads that may contain hot cinders buried in the waste.

b. Sparks from vehicle or machinery exhaust, mufflers, and brakes.

c. Lighted cigarettes or matches.

d. Lightning.

In conventional solid waste transit, hot or smoldering loads may contribute to the combustion of containerized refuse, leading to a "hot box" effect. Other potential sources of fires are petroleum products, solvents, and other materials that may be stored in the on-site facility used for the repair and maintenance of rolling stock.

The project site, rail right-of-way, and proposed access road are not located in hazardous fire areas, as designated in the Riverside County Comprehensive General Plan. The scarcity of vegetation on and adjacent to the project site and the lack of vegetation adjacent to the rail line and road limit the extent to which surface fires may spread as a result of project activities.

4. Vector and Disease Control

A vector is defined as any animal capable of carrying, transmitting, or causing disease or disrupting the normal enjoyment of life by adversely affecting the public health and well-being. One vector, common ravens, currently exist on the site. Other vectors associated with refuse disposal activities include rodents, flies, mosquitoes, and birds. The state Minimum Standards, Title 14, Chapter 3, of the California Code of Regulations include several requirements intended to minimize attraction and support of animals. These include direction that storage and collection of solid waste be accomplished in a manner that minimizes the propagation, harborage, or attraction of vectors (Sections 17312, 17331, and 17341). Transfer stations must be designed to minimize vectors (Section 17453); be cleaned daily (Section 17512); have wastes removed every 48 hours (Section 17513); have clean storage areas (Section 17520); and otherwise be operated in an appropriate manner (Section 17533)—all for the purpose of minimizing vectors. These measures are all intended to minimize the potential for vectors arriving at solid waste disposal sites.

For disposal sites themselves, similar requirements apply to their design (Section 17629) and compaction specifications to eliminate potential rodent harborage (Section 17677). The daily cover specification, applicable to all landfills receiving more than 50 tons per day, is the major vector control procedure. If not implemented, a very detailed protocol for the monitoring of insects and other vectors is required. In addition to the daily cover requirement, operators must take other steps to control vectors and birds (Section 17707).

5. Worker Safety

There are rules and regulations, as explained below, which are designed to safeguard the health and well-being of all workers at the project site. The working environment at all landfills poses some risks to workers. These risks involve potential exposure to small amounts of hazardous wastes they may have to remove from the refuse; risks of physical accidents with sharp objects in the solid waste or with equipment used to move containers, spread and compact refuse, and place cover material; and chronic exposure to areas with dust, odors, and noise levels which may cause discomfort or other health effects.

The 1970 Occupational Safety and Health Act (OSHA) requires that employers comply with the safety and health standards set by the act in order to provide each employee with a work site which is free from recognized hazards that are likely to cause death or serious injury. The Labor Department regulations dealing with OSHA are published in Title 29, Part 1910, of the *Code of Federal Regulations* under General Industry Standards. Additionally, 40 CFR 241 sets the Guidelines for the Land Disposal of Solid Wastes; Section 241.211 specifies safety requirements to protect the health and safety of personnel associated with the operation.

Title 14, CCR, Chapter 3 lists the Minimum Standards for solid waste handling and disposal within the state. Section 17342 deals specifically with equipment safety, stating that "vehicles and equipment used in the transport of garbage and rubbish shall be constructed and maintained in such a manner as to minimize the health and safety hazards to collection personnel and the public." Section 17670, addressing personnel health and safety, requires that "operating and maintenance personnel shall be required to wear and use approved safety equipment as determined necessary by the [Lead] Enforcement Agency," which is in this case the Riverside County Department of Health. Thus, enforceable regulations related to equipment safety would call for equipment-operator training and supervision, the wearing of seat belts while driving haul trucks, the use of horns and backup alarms, and the observance of parking procedures for unattended equipment, among others. Personal protection would involve first aid training, the wearing of protective footwear and eye goggles, the setting up of an emergency response plan/communications system as part of the operational plan for the landfill, and other standards related to shift rotation and measures to reduce such hazards as noise exposure.

Some aggregate and other rock products may be recovered from the project area. Thus, worker safety issues such as rockfalls, vehicle hauls, crushing, conveying, and other mining-related activities, which are covered by the Standards for Equipment Safety and for Personal Protection set by the 1977 Mine Safety and Health Act (MSHA), and which are listed in 30 CFR 57, would apply to any future mining operations.

6. Public Safety

The collection and transport of municipal solid waste is a very common occurrence in all neighborhoods, typically once per week. Refuse disposal trucks are occasionally involved in accidents that could result in spillage of solid waste material. A potential health and safety hazard could occur to the public if exposed to the refuse or associated vectors which may be attracted to the spillage area.

Except for service to the local area, the project does not involve the typical refuse disposal trucks for delivery of refuse to Eagle Mountain; it would rely primarily on trains and to a lesser extent on conventional semi-trailers to deliver solid waste to the landfill in standard intermodal transport containers. In this respect, the project is similar to a standard rail transport operation, rather than a refuse collection service.

Unlike many standard rail operations, however, the solid waste transported for the project would not be a hazardous material and would not be liquid or gaseous. Petroleum products, propane and other combustible gases, chlorine, ammonia, acids, and other hazardous materials and hazardous wastes are commonly transported throughout southern California every day. In the event of an accident, not only are these materials more hazardous than municipal solid waste, they can also flow or spread over a wider area surrounding the accident site. Thus, the relative risks involved in transporting municipal solid waste are less than many other commonly transported materials.

As a general statement, the potential for accidents with trains is much less than for trucks. A comparison of accident rates, as shown in Table 10, confirms this fact. This is because trains operate within a controlled right-of-way, with automated gates and barriers at most major street crossings and in a system with better signaling and communication than traffic on the open highway or on city streets.

Although Eagle Mountain Mine has been in a state of suspended operations since 1982, associated facilities exist on-site including the East Pit mine and supporting railhead, truck roads, and a processing area. A few buildings remain adjacent to the ore processing area south of the pit. Kaiser Steel Resources maintains a management office at the Eagle Mountain townsite. The effects of continued disuse are discussed in Section IV.B. of this draft EIS/EIR.

TABLE 10
TRANSPORT ACCIDENT RATES BETWEEN 1982 AND 1986

Item	1982	1983	1984	1985	1986
Number of accidents[1]					
Rail freight	4,589	3,906	3,900	3,275	2,620
Truck freight	32,277	31,628	36,853	39,273	26,176
Volume of freight transported (billion ton-miles)[2,3]					
Rail freight	810	841	935	895	889
Truck freight	520	575	606	610	634
Accident rate (accidents/billion ton-mile)					
Rail freight	5.6	4.6	4.2	3.7	2.9
Truck freight	62.0	55.0	60.8	64.3	41.2

[1]SOURCE: U.S. Department of Transportation 1988.

[2]SOURCE: Transportation Policy Associates 1988.

[3]A ton-mile is the movement of one ton (2,000 pounds) of freight for a distance of one mile.

C. Traffic and Transportation

The following report is based on a technical study prepared for RECON by DKS Associates of Santa Ana, California, in February, 1990. The traffic technical report is included with this report as Appendix D.

Existing conditions along both the proposed rail routes to the site and on roadways in the vicinity of the project were assessed. The Eagle Mountain Railroad crosses or is adjacent to the offered lands. No rail or road rights-of-way occur on the selected or offered lands involved in the land exchange. Figure 49 shows the project location, rail lines and segments analyzed, and hypothetical transfer station locations used in the analysis.

1. Rail Routes

The study area for the rail mode of transport includes all rail lines that may carry refuse from transfer stations to the site. For analysis purposes, a total of six possible locations for transfer stations were identified in San Bernardino, Los Angeles, and Orange counties.

A total of 268 miles of rail line was analyzed during the transportation study, with 231 at-grade crossings identified along their length, or an average of one at-grade crossing every 1.2 miles. The term "at-grade crossing" refers to any location where a rail line crosses a roadway facility without a grade separation (e.g., overpass or underpass), and the potential for conflicts between rail traffic and automobile/truck traffic exists. Data pertaining to rail and highway traffic volumes and crossing geometric conditions were obtained from a variety of sources, including the Southern Pacific Transportation Company, the California Public Utilities Commission (PUC), SCAG, Caltrans, and local city traffic surveys at over 97 percent of the crossings. Average daily train volumes ranged from 2 to 50 trains per day. The average daily volume of highway traffic using the at-grade crossings ranged from less than 1,000 vehicles daily to over 43,000 vehicles daily.

For the purposes of the analysis, it was assumed that all rail traffic would originate from points west of the project site, thus maximizing the potential effects on the circulation system to the west. The rail lines serving the various transfer stations assumed for this analysis were broken down into eight discrete segments (see Figure 49). The segments were identified based on locations of the transfer stations along the rail lines and key junction points where trains would be switched on or off a particular route. These segments are described briefly below.

<u>Segment 1A—Eagle Mountain to Ferrum Junction Right-of-Way</u>. This segment of rail extends from the Eagle Mountain Mine to Ferrum Junction. This privately owned rail line is approximately 52 miles long, 32 miles of which exist on a legislatively authorized right-of-way. Two at-grade crossings are identified along the length of this spur segment. The original

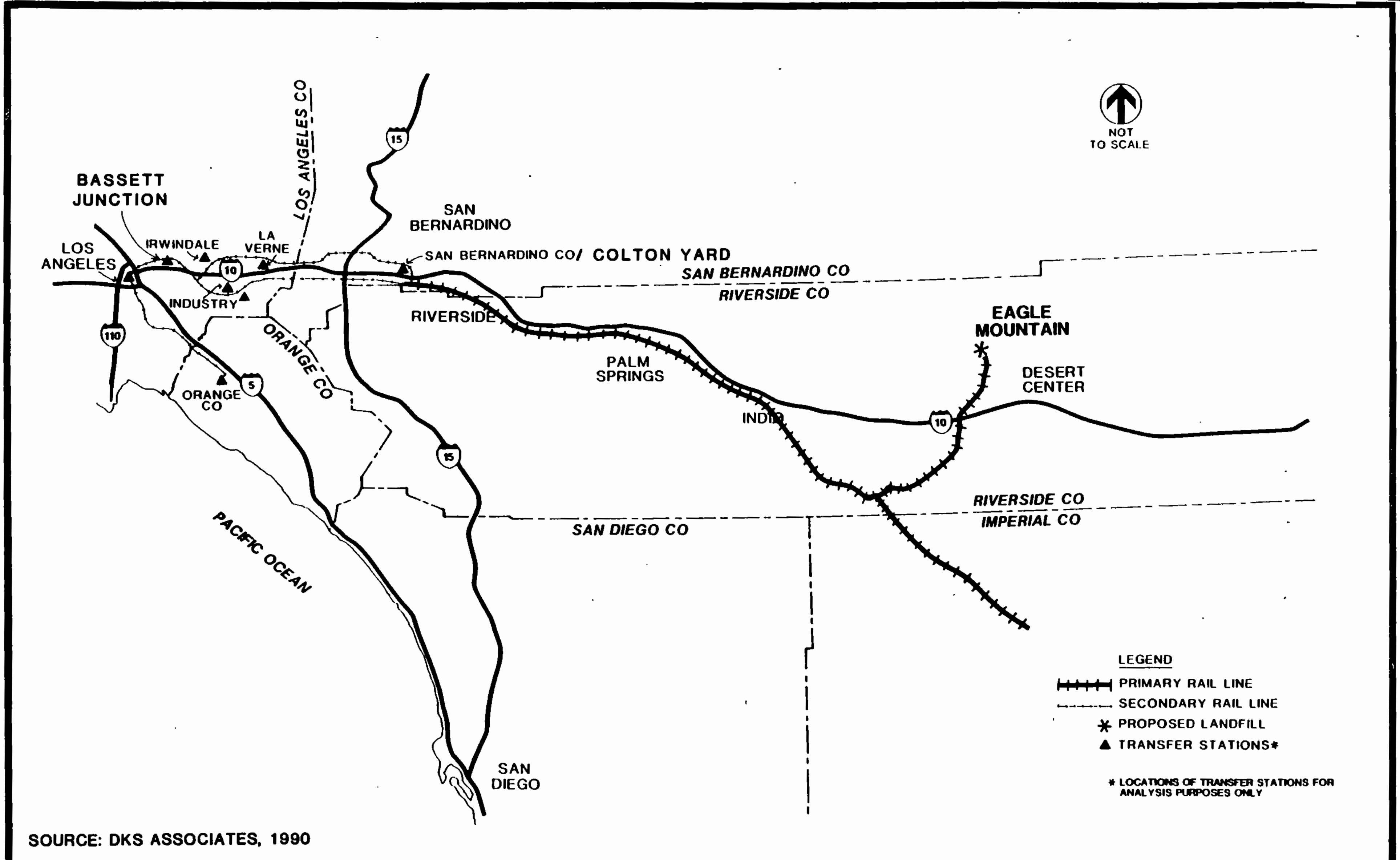


FIGURE 49. RAIL LINE SEGMENTS AND POSSIBLE TRANSFER STATION SITES

RECON

R-2100E 2/90

right-of-way for this portion of rail was granted to provide rail service to the mining operations at Eagle Mountain. In 1982 the mining activities were suspended and use of the railroad discontinued.

Segment 1B—Ferrum Junction to the Colton Yard/San Bernardino Transfer Station. This rail segment, noted as the primary rail line, is 94 miles in length and is owned by the Southern Pacific Transportation Company. There are 31 at-grade crossings identified along this spur segment. The average distance between crossings is over three miles. This is nearly twice as high as the next highest average distance between at-grade crossings for the other seven segments. The average roadway daily traffic volume was 2,200 vehicles per day, the lowest of all segments studied. Daily train volumes along this segment range from 28 to 50 trains daily, with a median average of 35 trains. Train speeds on this segment range from 30 to 60 miles per hour (MPH).

Segment 2—Colton Yard to the Industry Transfer Station. This segment is the second longest section within the study area. Twenty at-grade crossings were identified along its 33-mile length, or one at-grade crossing every 1.6 miles. The average at-grade crossing roadway volume on this segment was 8,700 vehicles per day, significantly higher than the average for the previous segment and slightly higher than the overall observed average of 7,200 vehicles per day. This is the second most heavily utilized rail line in the study area, with 28 to 35 trains per day using various portions of this segment. Most refuse trains would also use this segment of rail line, although shipments from Irwindale or La Verne could travel an alternate route to the Colton Yard. Train speeds on this segment range from 60 to 65 MPH. The roadway volumes at the at-grade crossings along this segment range from 900 vehicles per day to 20,000 vehicles per day, with the majority of crossings carrying between 4,000 and 10,000 vehicles per day.

Segment 3—Industry Transfer Station to Bassett Junction. This segment runs approximately 11 miles, from the east end of Industry to the west end of Industry, near Vineland Avenue. Nine at-grade crossing are located along this segment, with roadway volumes ranging from less than 1,000 vehicles per day to over 28,000 vehicles per day. Daily vehicular traffic volumes at the at- grade crossings averaged 10,100 vehicles per day on this rail segment. The average distance between crossings on this segment is 1.2 miles, somewhat less than the average distance between crossings on the segments previously mentioned.

Segment 4—Bassett Junction to the Southern Pacific's Los Angeles Transportation Center. This segment is approximately 14 miles long and terminates at the Southern Pacific's major yard facility in East Los Angeles. There are 20 at-grade crossings on this segment, located an average of 0.7 mile apart. The daily volume of train traffic averages 28 trains per day. Train speeds begin to drop on this segment, ranging from 60 MPH down to 20 MPH. Roadway traffic volumes at the at-grade crossings located along this segment are somewhat higher that the roadway volumes previously discussed. These volumes range from a low of 2,000 vehicles per day to over 30,000 vehicles per day at several crossings. The 14,100 vehicles per day average for at-grade crossings along this segment is the highest in the study area.

Segment 5—The Southern Pacific's Los Angeles Transportation Center to the Northern Orange County Transfer Station. A total of 50 at-grade crossings were identified along this 21-mile-long segment, resulting in an average of only 0.4 mile between crossings, the lowest of all segments studied. The roadway traffic volumes at the at-grade crossings are also relatively high, ranging from less than 1,000 vehicles per day to over 43,000 vehicles per day, the highest volume of roadway traffic in the study area. Train speeds along this segment range from just 10 MPH at the north end of the segment to a high of 20 MPH at the southern end of the segment. The average daily number of trains ranges from 4 to 30 trains per day, with most crossings experiencing 10 to 12 train crossings per day. Only trains to and from the northern Orange County transfer station would utilize this segment.

Segment 6—The Colton Yard to the La Verne Transfer Station. This segment of rail line could potentially serve shipments from both the La Verne transfer station and the Irwindale transfer station. There are a total of 74 at-grade crossings along this 30-mile length of rail line, or one crossing every 0.4 mile. The average vehicular traffic volume for at-grade crossings along this segment is 3,700 vehicles per day, well below the overall observed average. The number of trains traversing this segment is also below the average observed elsewhere in the study area. Only two to eight trains per day traverse the various at-grade crossings along this segment, with only two trains per day at most crossings. Train speeds range from 30 to 60 MPH on this segment.

Segment 7—The La Verne Transfer Station to the Irwindale Transfer Station. This segment of rail line is only nine miles long and might be used by shipments from the Irwindale transfer station (eastbound) or the La Verne transfer station (westbound). The traffic volumes at the at-grade crossings on this segment are lower than the overall study area average. The average along this segment is 3,000 vehicles per day, lower than any other segment except Segment 1. There are an average of two at-grade crossings per mile along this segment, ranking third among the segments analyzed. There are a total of 19 crossings along this nine-mile-long segment of railroad. Train traffic along this segment is very consistent, with an average of four trains per day reported at each of the at-grade crossings. Travel speeds on this segment of rail line range from 20 to 40 MPH.

Segment 8—The Irwindale Transfer Station to Bassett Junction. This is the final segment of railroad included in the Eagle Mountain transportation study. Only 4.5 miles long, usage of this segment would be similar to the usage described for Segments 6 and 7, with shipments possible from either the Irwindale transfer station or the La Verne transfer station. The average traffic volume at the at-grade crossings along this segment is 7,600 vehicles per day, slightly higher than the overall study area average. The at-grade crossings are an average of 0.6 mile apart, approximately half the study area average. Train traffic along this segment averages four trains per day. Train speeds along this segment are limited to 20 MPH along the entire 4.5-mile-long segment.

An important concern of the public when assessing the impacts of increased train traffic is the delay to highway traffic when the train crosses an at-grade crossing. Under existing conditions, most crossings would experience relatively low delays during the passage of a refuse train. Vehicle delay is expressed as total vehicle hours of delay (VHD). This measure describes a cumulative amount of delay time experienced by each vehicle entering and leaving a crossing. It is a function of the length of time the crossing is blocked by a train, the average daily traffic at the crossing, the number of lanes, and the vehicle departure rate. One vehicle hour of delay is equivalent to 60 vehicles experiencing a delay of one minute at a grade crossing. The description of delays here and in the impact analysis focuses on the at-grade crossings located along the primary study segment (Segment 1) and includes all locations along other segments where a total of at least one-half hour of vehicle delay would occur under existing conditions during the passage of a typical refuse train. This is the equivalent of the delay at a minor signalized intersection serving 1,000 vehicles during a single peak hour, operating at Level of Service A (LOS A, i.e., excellent operating conditions), with only two seconds of delay for each vehicle.

Under the existing conditions along the primary segment, the total delay for all crossings caused by the passage of a single train with the proposed configuration of the unit trains traveling to the site would be 0.94 vehicle hour. Some of the freight trains currently operated by the Southern Pacific Transportation Company are longer than those proposed for the project and, thus, cause somewhat longer delays under the present conditions. The existing volume of train traffic along this segment (28–50 trains per day), thus, causes cumulative delays ranging up to about 50 vehicle hours per day. The number of vehicles delayed at a single crossing is approximately 12 vehicles, at Hunts Lane in Colton and at Monroe Street in Indio. In general, the existing per-vehicle delays are estimated to be on the order of one minute for each vehicle.

Total delays estimated for the Slauson Avenue crossing on Segment 5 average 1.7 minutes to each vehicle under the present conditions. Although the crossing is not the highest volume crossing in the study area, a combination of low train speeds and fairly high traffic volumes (averaging 28,300 vehicles per day) result in the highest overall delay of any crossing in the study area.

A relative hazard index has been calculated for each of the at-grade crossings on the primary rail segment and all secondary rail segment crossings included in the delay analysis. These locations are also likely to involve the greatest number of conflicts between trains and vehicular traffic. This index is intended to identify the relative estimated hazard among the approximately 100 crossings included in the analysis. It is not intended to specifically identify high or low probability of accidents, nor is it meant to predict rail/vehicular traffic accidents due to increases in train activity. The hazard rating index is calculated by multiplying the average 24-hour traffic volume by the average 24-hour train volume, then multiplying by a protection factor which depends on the safety improvements at the crossing. The protection factor values are empirical coefficients that account for the reduction in potential hazard provided by various types of protective devices. Protection factor values are discussed on page 19 of the traffic appendix of this draft EIS/EIR and are as follows:

Protection Type	Factor
Crossbuck	1.00
Signs	1.00
Wigwag	0.34
Flashing light	0.20
Automatic gates	0.11

The highest ranking locations are found in Los Angeles and Orange counties, the more urbanized parts of the study area.

2. Truck Routes

Truck traffic to the site will be generated from a variety of areas. Due to the widespread wasteshed to be served by truck and the fact that exact transfer station locations are not yet identified, it is not possible to quantify all trucking-related impacts from point of origin to the Eagle Mountain landfill site. The Interstate 10 freeway is the first route where all truck trips to the site will converge and, therefore, is one major focus of the analysis. The other key routes included in the truck impact study area are Eagle Mountain Road, Kaiser Road, Desert Center Rice Road, and Ragsdale Road. These routes are currently being used by trucks delivering refuse to the County landfill on Kaiser Road. Figure 50 shows the existing daily traffic for each key route with a brief description of each route provided below. The traffic counts were taken during the month of November, 1989, except for the freeway volumes, which were counted by Caltrans in 1988. All volumes represent a 24-hour time period.

Interstate 10 Freeway. This freeway facility runs from the Los Angeles area through a portion of San Bernardino County into Riverside County and past the Eagle Mountain site. It is the major access route for all auto mobile and truck traffic originating at or destined to the project site. Near the site, I-10 has two lanes in each direction and carries an average daily traffic volume of 12,200 vehicles, with a peak-hour volume of 850 vehicles.

Eagle Mountain Road. Eagle Mountain Road would be the main surface roadway access route for truck traffic between I-10 and the project site. The road runs from south of I-10 to the Metropolitan Water District pumping station, located approximately seven miles north of the freeway. Except for that portion of roadway beneath the freeway overcrossing, Eagle Mountain Road up to the pumping station is a two-lane roadway with a 20-foot paved width. Existing traffic volumes on Eagle Mountain Road and its freeway interchange with I-10 are very low

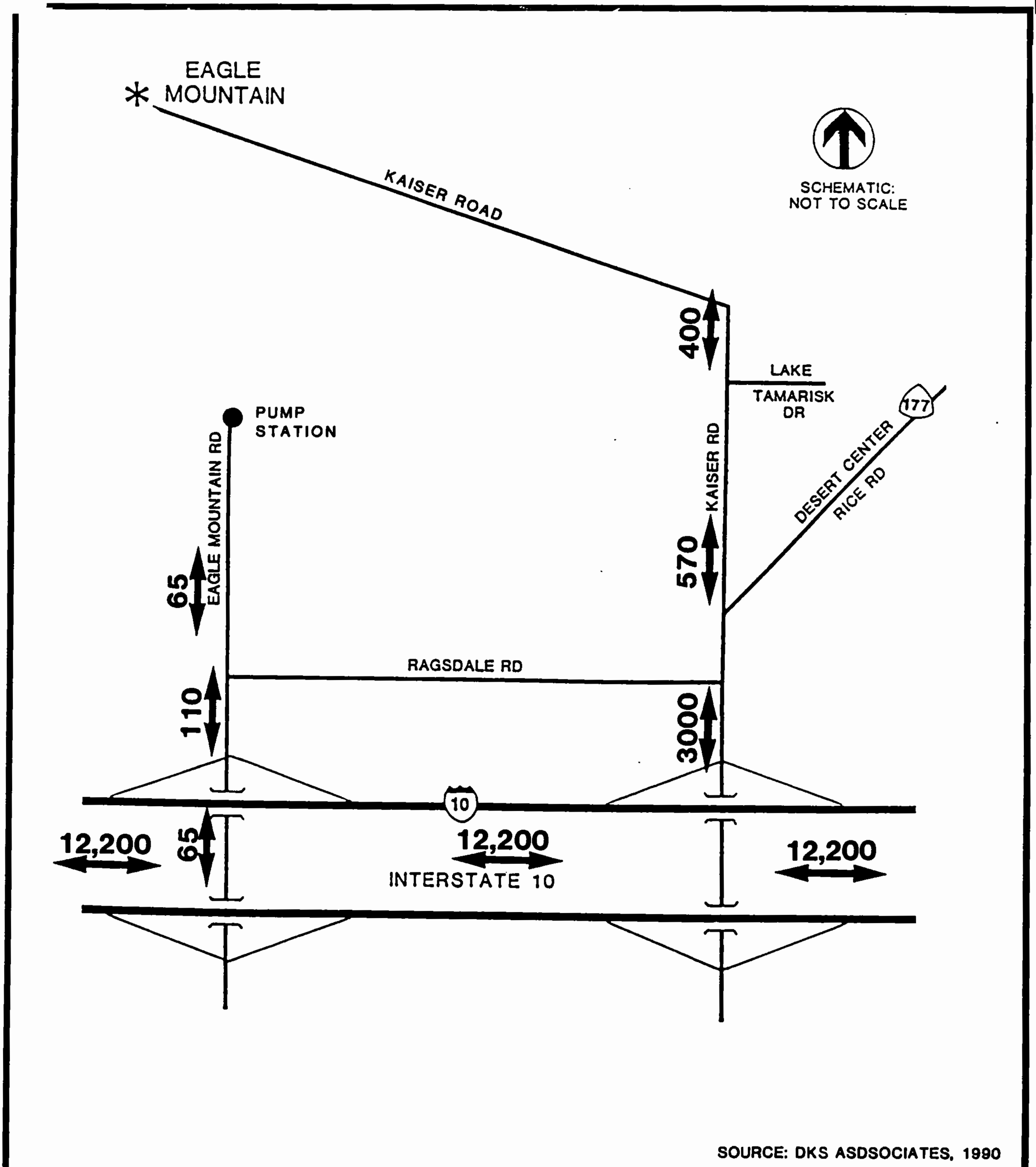


FIGURE 50. EXISTING AVERAGE DAILY TRAFFIC

since the roadway primarily serves only traffic related to the pumping station. The average daily traffic volume on Eagle Mountain Road north of the freeway ramps is 110, while north of Ragsdale Road it drops to 65 vehicles.

The existing geometrics of the proposed truck route, from Eagle Mountain Road to just south the pumping station, are well-suited for use by the trucks that will be carrying refuse to the site. No evidence of deficient turning radii, horizontal and vertical alignment, or roadway widths was found along the proposed truck route. Analysis of existing intersection operations indicates that current intersection operations are excellent, with LOS A conditions for all traffic movements at each intersection analyzed.

Kaiser Truck Trail. The Kaiser Truck Trail right-of-way begins near the Metropolitan Water District's pumping station and travels northwest to the Eagle Mountain townsite. This 15- to 20-foot-wide segment, once paved, is presently in a state of disrepair. Portions of the pavement have been broken and washed away and are now covered with sand and other debris. Traffic is restricted to an occasional four-wheel-drive vehicle. The Kaiser Truck Trail right-of-way will be relinquished and the route will not be used for the project.

Eagle Mountain Road Extension. The proposed action includes an extension of the existing Eagle Mountain Road. As Figure 12 shows, the road right-of-way will extend from south of the MWD pumping station, approximately one mile northeast along the Kaiser Truck Trail alignment. Then the new road will travel northwest approximately 3,000 feet to where the Eagle Mountain Railroad diverges northwest away from the truck trail. At that point, the road will follow the rail alignment to near where it crosses the California Aqueduct. The new road will then head north to the existing main haul road at the mine site. This new right-of-way will pass through approximately one mile of undisturbed desert habitat and approximately one mile of disturbed tailing ponds.

Kaiser Road/Desert Center/Rice Road Interchange. Kaiser Road runs from the freeway north to the existing Eagle Mountain Mine site (approximately 11 miles from the freeway). Access to Kaiser Road from the freeway is provided by the Desert Center/Rice Road interchange. The average daily traffic volumes at the interchange and on Kaiser Road are considerably higher than Eagle Mountain Road due to traffic related to the services in Desert Center, the residential population of Lake Tamarisk (approximately 550 people), the operations at the Eagle Mountain site, and the existing school operations. Between Ragsdale Road and the freeway, Desert Center/Rice Road carries 3,050 vehicles per day. Kaiser Road between Desert Center/Rice Road and Lake Tamarisk Drive carries 570 vehicles per day and 400 vehicles per day north of Lake Tamarisk Drive.

Ragsdale Road. Ragsdale Road is a short, two-lane roadway which connects Eagle Mountain Road with Kaiser Road. It runs immediately north of and parallel to the freeway. It is 36 feet wide, except at several bridges where it narrows to 24 feet.

3. Future Conditions Without the Project

The physical characteristics of the rail and highway system are not expected to undergo significant change between 1990 and 1995, the year by which the landfill project is anticipated to begin operation at its maximum capacity. The volume of rail traffic on the rail lines studied is expected to remain fairly static during this period. Highway traffic volumes, however, are sensitive to the increasing urbanization of the region, and these increases will affect both the rail and highway analyses (Figure 51).

The annual growth rates for highway traffic using at-grade crossings and on roadways included in the highway impacts study area were projected based on regional data pertaining to projected trip-making characteristics in the vicinity of the at-grade crossing/roadway. Projected average annual growth in highway traffic ranged from a low of 0.7 percent per year in the east San Gabriel Valley to a high of 3.6 percent per year in the Chino Basin region of San Bernardino County. Growth in the Desert Center area is projected to be at a rate of 3.5 percent per year, or a 23 percent rate of growth between 1989 and 1995. Appendix D (page 25) contains more information regarding these projections.

Recalculation of the hazard indices for each of the at-grade crossings assessed under existing conditions indicates that the faster growth in the outlying areas of the region would result in somewhat higher positions in the overall rankings of at-grade crossings by hazard level. The highest values are projected for at- grade crossings located within the heavily urbanized western regions of the study area.

A reassessment of intersection operating conditions utilizing the increased traffic volumes indicated that LOS A conditions are projected for all turning movements at every intersection analyzed. No impact is anticipated.

4. Transfer Stations

The current trend towards locating landfills farther from urban population centers means that refuse must be hauled longer distances and through more intersections than if centralized transfer stations are employed. This means that localized impacts related to the transfer stations will almost certainly be more than offset by the reduced distances that most refuse will travel on the roadway system. In summary, regional impacts of the transfer station system are beneficial, although some local impacts may require mitigation. Study of localized impacts at transfer stations is beyond the scope of this draft EIS/EIR but should be addressed as those transfer stations are developed. A detailed discussion of the transfer stations, their existing traffic conditions, and impacts is not possible without a definitive location.

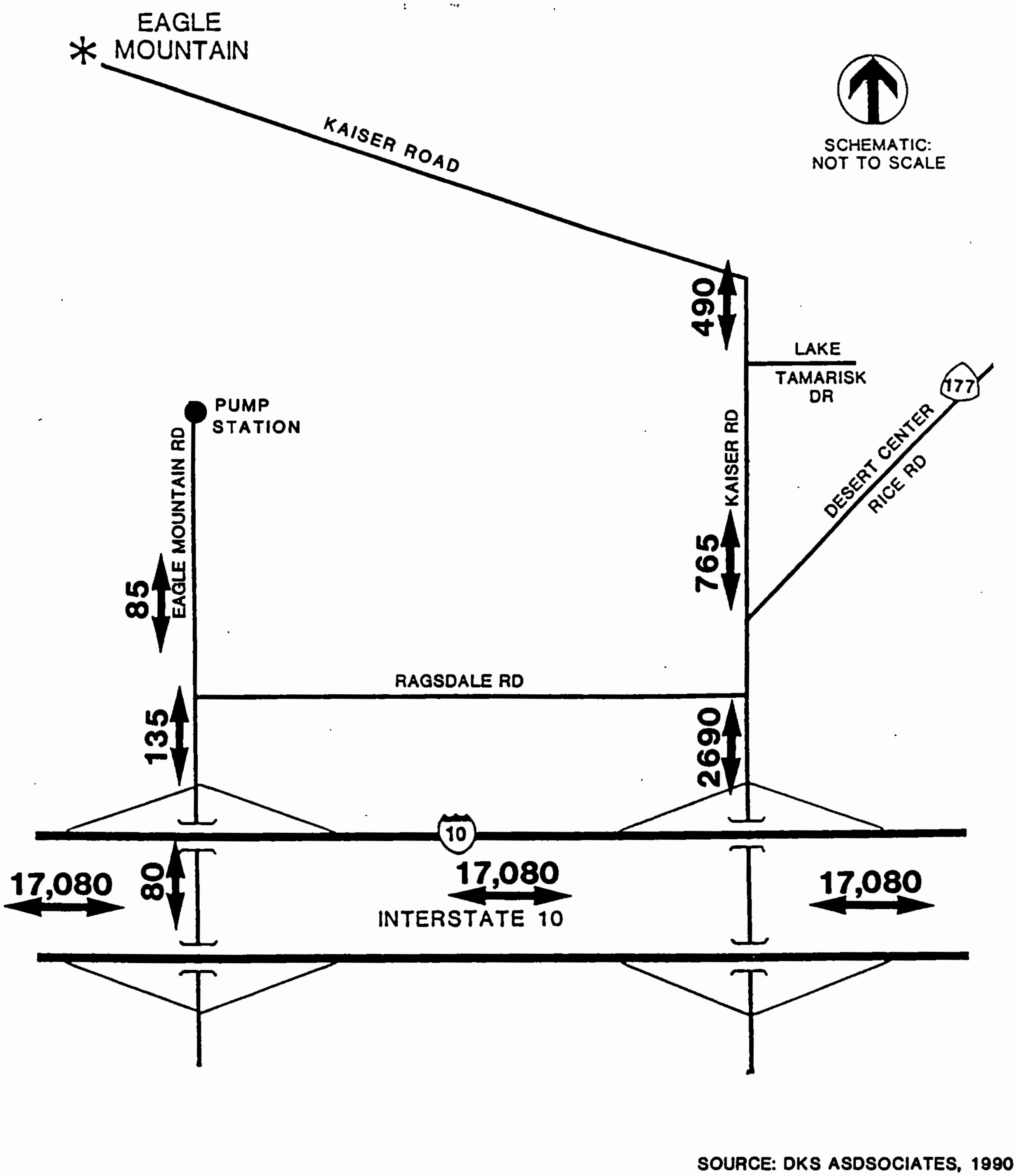


FIGURE 51. FORECAST 1995 DAILY TRAFFIC WITHOUT PROJECT

RECON

D. Air Quality

This section provides an overview of the environmental setting for air quality, including geography, topography, meteorology, existing air quality trends and conditions, and the regulatory setting. Additional setting and impacts information is contained in the air quality technical report (Appendix E) prepared by Sierra Research Inc.

1. Geography/Topography

a. South Coast Air Basin

The South Coast Air Basin (SCAB) covers 6,215 square miles and consists of the metropolitan areas of Los Angeles, including Orange, San Bernardino, and Riverside counties (Figure 52). It is bounded on the northwest by Ventura County and on the south by San Diego County. The northern boundary runs roughly along the Angeles National Forest line north of the crest of the San Gabriel and San Bernardino mountains. The eastern border runs north-south through the San Bernardino and San Jacinto mountains, although the Banning Pass area is excluded from the air basin. The remaining boundary line is the entire shoreline of Los Angeles and Orange counties.

Within the rim of high mountains that rise to altitudes greater than 11,000 feet, the basin is a coastal plain with connecting broad valleys and low hills. On most days, the net wind flow is from west to east, which produces the effect of having air pollution source areas near the coast impacting receptor areas inland to the east. This source-receptor relationship is compounded by the population distribution in the basin. The highest population, the greatest population density, and the majority of industries, commerce, and streets and freeways are located in the principal source areas in the western portion of the basin.

b. Southeast Desert Air Basin

The Southeast Desert Air Basin (SEDAB) is composed of the eastern part of San Bernardino, Riverside, Kern, Los Angeles, and San Diego counties and all of Imperial County, covering a total area of 33,636 square miles (see Figure 52). It is separated from the coastal regions by mountain ranges, which also provide a climatological boundary. The basin is naturally divided into two distinct parts: the high desert (Mojave) and the low desert (Colorado). The Imperial and Coachella valleys constitute the major portion of the southern part of the SEDAB. These valleys form a great depression of roughly V-shaped ground plane.

Eagle Mountain, the site of the landfill specific plan area, is located in the eastern portion of the SEDAB, in the transition area between the Mojave and Colorado desert areas.

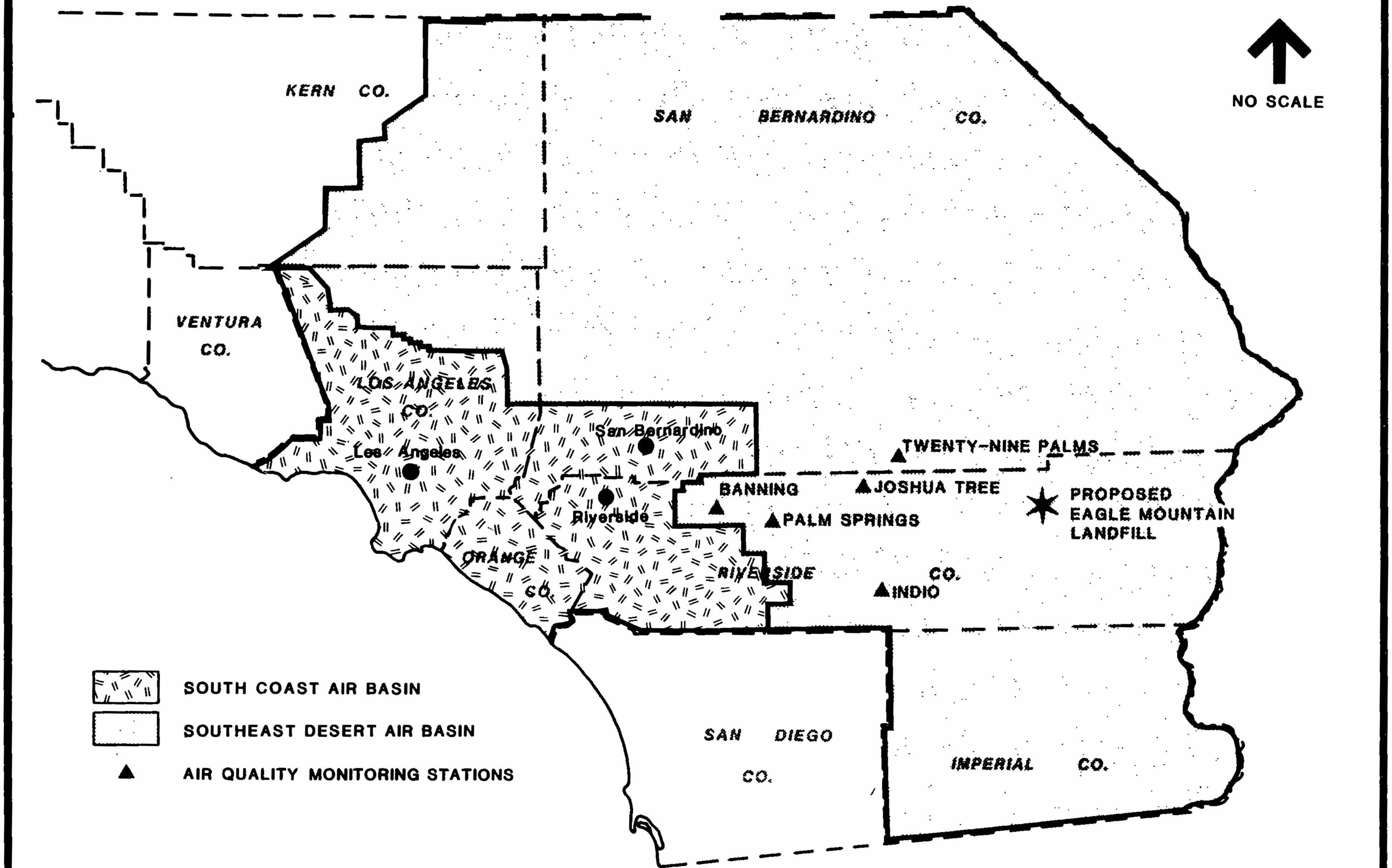


FIGURE 52. AIR BASINS AND AIR QUALITY MONITORING STATIONS ASSOCIATED WITH THE PROPOSED PROJECT

RECON

2. Meteorology

a. South Coast Air Basin

The SCAB lies within the semipermanent high-pressure zone of the eastern Pacific Ocean. Typical of coastal strips along the western shores of continents at lower latitudes, the region is characterized by warm, dry summers and mild winters of moderate rainfall.

During the dry season, and to a lesser degree during the winter, the daily circulation pattern in the basin is typified by a daytime sea breeze blowing onshore and a nighttime land breeze moving offshore. Generally, the sea breeze is about twice as strong as the land breeze, and summer wind speeds average slightly higher than winter wind speeds. Throughout the year during the night, a drainage flow exists as cool air from the nearby mountain slopes drains down and back toward the ocean.

The vertical dispersion of air pollutants in the SCAB is limited by the presence of a persistent temperature inversion (a temperature increase with altitude) in the lower atmosphere. For that reason, the base of the inversion is called the "mixing height" of the atmosphere. Usually, inversions are lower before sunrise than during the daylight hours. The mixing height normally increases during the day as the base of the inversion erodes because of surface heating. Along the coast of southern California, relatively cool surface air temperatures, coupled with warm, dry, subsiding air from aloft, produce inversions about 87 percent of the time in the early morning.

b. Southeast Desert Air Basin

The SEDAB includes the hottest and driest parts of California, with a climate characterized by hot, dry summers and relatively mild winters. Rainfall is scant in all seasons, so differences between the seasons are marked principally by differences in temperature and not by substantial rainfall during any season.

During the summer, the Pacific High is well developed to the west of California, and a thermal trough overlies the SEDAB. The intensity and orientation of the trough varies from day to day. Although the rugged mountainous country prevents a normal circulation, the influence of the trough does permit some interbasin exchange with coastal locations through the passes.

The relative humidity in summer is very low, averaging 30 to 50 percent in the early morning and 10 to 20 percent during the late afternoon. During the hottest part of the day, humidities below 10 percent are common. These conditions promote intense heating during the day in summer and marked cooling at night, and the intense solar radiation is highly conducive to the formation of photochemical smog. During all seasons, the prevailing wind direction is predominantly from the south and west.

3. Existing Air Quality—Overview

The federal Clean Air Act provides that national ambient air quality standards (NAAQS) can be exceeded no more than once each year. The U.S. Environmental Protection Agency has set standards for sulfur dioxide, nitrogen dioxide, carbon monoxide, 10-micron particulate matter (PM10), lead, and ozone. An area where an NAAQS is exceeded twice or more during a year can be considered a "non-attainment area" subject to more stringent planning and pollution control requirements. Once an area has been declared to be in nonattainment for a pollutant, it must show 12 consecutive calendar quarters with no violation of the NAAQS for that pollutant in order to be redesignated as an "attainment" area.

State of California ambient air quality standards are set by the state Air Resources Board (ARB) to protect public health and welfare. Standards have been set for sulfur dioxide, nitrogen dioxide, carbon monoxide, 10-micron particulate matter, lead, sulfates, hydrogen sulfide, vinyl chloride, and ozone at levels designed to protect the most sensitive portions of the population, particularly children, the elderly, and people who suffer from lung or heart diseases (Table 11). ARB performs program oversight activities, while primary air quality planning and enforcement activities are carried out by local air pollution control districts.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. The concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and occasionally damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short period of time (one hour, for instance) or to a relatively lower average concentration over a much longer period (one month or one year). For some pollutants there is more than one air quality standard, to reflect both its short-term and long-term effects.

As a summary of the air quality in the immediate vicinity of the landfill specific plan area, it may be noted from the discussions below that the eastern portion of the SEDAB is either considered an attainment area or is unclassified for each of the federal criteria air pollutants. An area is considered "unclassified" if there is insufficient monitoring data to support a firm designation as attainment. In areas remote from urban development, data is insufficient simply because no monitoring stations have been established there. No monitoring stations have been established in most of these remote areas because there have been no indications of significant problems. Thus, for purposes of air quality planning, the designation of unclassified is considered the same as attainment.

Although there are no published monitoring data from the immediate vicinity of the project site, baseline monitoring for weather conditions and some pollutants did begin in 1990. The limited data collected so far indicate that there have been no violations of any federal criteria

POLLUTANT	AVERAGING TIME	CALIFORNIA STANDARDS (1)		NATIONAL STANDARDS (2)		
		Concentration	Method	Primary	Secondary	Method
Ozone	1 Hour	0.09 ppm (180 μg/m3)	Ultraviolet Photometry	0.12 ppm (235 μg/m3)	Same as Primary Standards	Ethylene Chemiluminescence
Carbon Monoxide	8 Hour	9.0 ppm) (10 mg/m3)	Nondispersive Infrared Spectroscopy	9.0 ppm (10 mg/m3)	Same as Primary Standards	Nondispersive Infrared Spectroscopy
	1 Hour	20 ppm (23 mg/m3)		35 ppm (40 mg/m3)		
Nitrogen Dioxide	Annual Average	-	Gas Phase Chemilum-inescence	0.053 ppm (100 μg/m3)	Same as Primary Standards	Gas Phase Chemiluminescence
	1 Hour	0.25 ppm (470 μg/m3)		-		
Sulfur Dioxide	Annual Average	-	Ultraviolet Fluorescence	0.03 ppm (80 μg/m 3)	-	Pararosaniline
	24 Hour	0.05 ppm (131 μg/m3)		0.14 ppm (365 μg/m 3)	-	
	3 Hour	-		-	0.5 ppm (1300 μg/m3)	
	1 Hour	0.25 ppm (655 μg/m 3)		-	-	
Suspended Particulate Matter	Annual Geometric Mean	PM-10 30 μg/m3	Size Selective High Volume Sampler and Gravimetric Analysis	PM-10 (3) 50 μg/m3	Same as Primary Standards	Inertial Separation and Gravimetric Analysis
	24 Hour	PM-10 50 μg/m3		PM-10 150 μg/m3		
Sulfates	24 Hour	25 μg/m3	Turbidimetric Barium Sulfate	-	-	-
Lead	30 Day Average	1.5 μg/m3	Atomic Absorption	-	-	Atomic Absorption
	Calendar Quarter	-		1.5 μg/m3	Same as Primary Standards	
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m 3)	Cadmium Hydroxide Stractan	-	-	-
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 μg/m3)	Tedlar Bag Collection, Gas Chromatography	-	-	-
Visibility Reducing Particles	1 Observation	In sufficient amount to reduce the prevailing visibility to less than 10 miles when the relative humidity is less than 70%		-	-	-

ppm - parts per million

μg/m3 - micrograms per cubic meter

mg/m3 - milligrams per cubic meter

(1) CO, SO_2 (1 Hour), NO_2, O_3 and PM-10 Standards are not to be exceeded. All other Standards are not to be equaled or exceeded.

(2) Not to be exceeded more than once a year.

(3) Annual arithmetic mean

TABLE 11. CALIFORNIA AND FEDERAL AMBIENT AIR QUALITY STANDARDS

pollutant standards, but the state ozone standard has been reached on one day (Withycombe, Sierra Research, 3/6/91).

In the analysis of the impacts of the project, conservative assumptions are made regarding the existing concentrations of various pollutants in and around Eagle Mountain, based on the maximum recorded concentrations at the nearest monitoring stations which are likely higher than those actually occurring at Eagle Mountain.

4. Criteria Pollutants—Air Quality Trends

Appendix E (pp. 8-39) includes a discussion of the existing air quality trends in both the SCAB and the SEDAB. The appendix has graphic summaries of trends covering the last 10 years. The following paragraphs summarize that discussion.

a. Ozone

South Coast Air Basin

Ozone (O_3) is an end product of complex reactions between reactive organic gases (ROG) (or non-methane hydrocarbons, NMHC) and nitrogen oxides (NOx) in the presence of intense ultraviolet radiation. ROG and NOx emissions from millions of vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. Maximum ozone concentrations in the SCAB usually are recorded during the summer months.

The state ozone air quality standard is exceeded over half the days in the year. Peak ozone levels have slowly but steadily declined in the SCAB over the last 10 years, despite significant population growth in the region. However, the frequency of violations has remained relatively constant over the last several years after a substantial drop in the late 1970s and early 1980s. The basin is a nonattainment area for ozone for purposes of state and federal air quality planning.

Southeast Desert Air Basin

Ozone (O_3) is a problematic air contaminant in the SEDAB. The bulk of the ozone (and ozone precursors) in the basin comes from the heavily populated SCAB to the west. Maximum ozone concentrations in both the SCAB and the SEDAB usually are recorded during the summer months. In the SEDAB, maximum ozone concentrations historically have been measured at Banning (in San Gorgonio Pass) and Hesperia (near Cajon Pass) monitoring stations. Both of these stations are close to the SEDAB boundary with the SCAB, where readings would be expected to be higher than in other areas in the SEDAB.

State and federal ozone air quality standards are exceeded in the western portion of the SEDAB on roughly one-third to one-half the days in the year. While the maximum hourly concentrations have stayed relatively constant since 1973, in the range of 0.25 part per million (ppm), the number of days and hours each year when the standard is violated is on an upward trend since 1983. The basin is a nonattainment area for ozone under the state standards. Under the federal standards, the eastern and northeastern portions of the air basin are unclassified and the southwestern area is a nonattainment area for ozone.

At Joshua Tree National Monument, the federal one-hour average ozone standard of 0.12 ppm has been exceeded one day per year for several years. The ozone levels are believed to be responsible for leaf damage on some plants which are sensitive to ozone (Christiano 1990:2).

b. Nitrogen Dioxide

South Coast Air Basin

Nitrogen dioxide (NO_2) is formed primarily in the atmosphere from a reaction between nitric oxide (NO) and oxygen or ozone. Nitric oxide is formed during high temperature combustion processes when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes under certain conditions.

In the SCAB, a long, steady decline in NO_2 levels appears to have ended in the late 1980s. The basin is a nonattainment area for NO_2 for purposes of state and federal air quality planning.

Southeast Desert Air Basin

Nitrogen dioxide concentrations in the SEDAB have been below the state and federal standards for several years. Maximum one-hour NO_2 levels have been in a long-term decline since the late 1970s and are currently at about half the state standard. The last violation day was recorded in 1981. All areas in the air basin are either classified as attainment areas or are unclassified.

c. Carbon Monoxide

South Coast Air Basin

Carbon monoxide (CO) is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas in California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors. Industrial sources of pollution typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and stagnant weather conditions.

Maximum eight-hour CO levels in the SCAB are roughly two to three times the state and federal standards. The federal one-hour standard is being met, but not the more stringent state standard. While CO levels have decreased over the last 20 years, the trends have "flattened out" over the last 5 to 10 years, with little additional progress. The basin is a nonattainment area for CO for purposes of state and federal air quality planning.

Southeast Desert Air Basin

In the SEDAB, CO levels are well below the state and federal standards. The basin is considered in attainment for CO. There have been no exceedances of any state or federal air quality standards for CO since 1979 in the SEDAB. The basin is considered an attainment area for CO for purposes of state and federal air quality planning.

d. Sulfur Dioxide

South Coast Air Basin

Sulfur dioxide (SO_2) is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of the state, depending on local fuel characteristics, weather, and topography.

The 1984 maximum 24-hour average SO_2 level was slightly above the California standard; no exceedances of state or federal SO_2 standards have been observed since that time. SO_2 levels in the SCAB generally have been within state air quality standards since 1981. The basin is considered to be an attainment area for SO_2 purposes of state and federal air quality planning.

Southeast Desert Air Basin

SO_2 levels in the SEDAB have been well within air quality standards since 1978. The most recent violation of the more stringent state standard was in 1977. The basin is considered to be in attainment of the state and federal SO_2 standards.

e. Particulate Sulfates

South Coast Air Basin

Particulate sulfates are the product of further oxidation of sulfur dioxide. Elevated levels can also be due to natural causes, such as sea spray.

Maximum 24-hour sulfate levels in the SCAB do not quite meet the state standard. Maximum sulfate concentrations have been in a steady decline for several years, although they may have leveled out in the late 1980s. The SCAB is a nonattainment area for sulfates for state air quality planning purposes. There is no federal standard for sulfates.

Southeast Desert Air Basin

The trend of sulfate levels in the SEDAB show that in 1985 and 1986, the maximum readings were abnormally high. These aberrant levels were recorded at China Lake during a brief period of extremely high winds that entrained the naturally occurring sulfates from the dry lake there. The basin is considered attainment for state air quality planning purposes; as noted above, there is no federal standard for sulfates.

f. Fine Particulates (PM10)

South Coast Air Basin

Particulates in the air are caused by a combination of windblown fugitive dust, particles emitted from combustion sources (usually carbon particles), and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and oxides of nitrogen.

Beginning in 1984, the ARB adopted standards for fine particulates (particulate matter less than 10 microns in size) and phased out the preexisting TSP standards. PM10 standards were substituted for TSP standards because PM10 corresponds to the size range of inhalable particulates related to human health. In 1987, EPA also replaced national TSP standards with PM10 standards.

In the SCAB, 24-hour PM10 levels are four to six times the state standard. However, there are not enough years of observation to reveal a trend. The basin is a nonattainment area for PM10 for purposes of state air quality planning. Upon promulgation of the PM10 regulations by the EPA, all areas were designated attainment areas, regardless of the current air quality standing for TSP.

Southeast Desert Air Basin

The state PM10 standards are being exceeded about 50 days per year, while federal standards are exceeded less than 10 days per year. As discussed above, there are not enough years of observation to reveal a trend. The basin is considered a nonattainment area for PM10 for state air quality planning purposes. Upon promulgation of the PM10 regulations by the EPA, all areas were designated attainment areas, regardless of the current air quality standing for TSP.

5. Other Air Quality Issues

Other air quality issues include regional visibility, acid deposition, toxic air pollutants, interbasin transport, and global warming. These issues are discussed in the air quality technical appendix. Toxic air pollutants present in landfill gas are discussed in the Environmental Consequences section of this report, both in Air Quality (Section IV.D.), and in Public Health and Safety (Section IV.B.).

Joshua Tree National Monument is an area for which visibility is a special concern. The Secretary of the Interior has certified to the EPA that visibility at Joshua Tree National Monument is already being adversely affected by regional haze (Christiano 1990:1). As noted above, however, there is no federal standard related to sulfates or otherwise related to visibility. The state standard for visibility-reducing particles has not been in effect long enough to allow classification of areas to occur. The issue of fugitive dust is addressed in detail in the Environmental Consequences section.

6. Regulatory Setting

This section contains a brief summary of some of the existing air quality regulations and plans which relate to the Eagle Mountain project. A more detailed discussion of the regulatory setting is contained in the air quality technical appendix.

a. Federal Prevention of Significant Deterioration Program

The EPA has promulgated Prevention of Significant Deterioration (PSD) regulations for areas that have achieved the NAAQS. The PSD program allows new sources to be constructed or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas).

b. Federal New Source Performance Standards

The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those which have a National Ambient Air Quality Standard and their precursors) from such sources. The New Source Performance Standards apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. As of late 1990, the EPA was working on a draft set of standards and guidelines for the control of gaseous emissions from municipal solid waste landfills. If emissions of landfill gas from the project after the imposition of control measures were to exceed a limit to be specified in these guidelines, then they would be subject to review and regulation by the EPA.

c. California Clean Air Act

AB 2595, the "California Clean Air Act" (Act) was enacted by the California legislature and became law on January 1, 1989. The Act requires the local air pollution control districts to attain and maintain the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for the local districts and the California Air Resources Board. The most immediate milestone is the requirement that local districts submit air quality plans to the Air Resources Board.

The plans are required to demonstrate attainment of the state ambient air quality standards, and specifically, the plans must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and their precursors) in a given district. A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand their vehicle inspection and maintenance program. There is no immediate impact on the project, because the Act directly affects only the local districts. However, future district regulations developed and adopted to achieve the requirements of the Act may apply to the proposed project and affect future plans for expansion or modification.

d. Local New Source Review Requirements

The South Coast Air Quality Management District administers air quality planning and regulation for the SEDAB. The SCAQMD conducts a preconstruction review program for all new or modified sources of air pollution. This program, which is known as New Source Review, is prescribed in the district's Regulation XIII. The New Source Review program contains three principal elements:

- Best available control technology
- Emissions offsets
- Air quality impact analysis

Best available control technology and emissions offsets are for all new emissions sources or modifications of existing sources. The New Source Review regulation also requires that a project neither cause nor contribute measurably to a violation of any state or national ambient air quality standard. The SCAQMD has also adopted additional rules that prescribe requirements for review of new or modified sources of toxic air contaminants.

e. Other Local Regulatory Requirements

As required by the federal Clean Air Act, plans that demonstrate attainment must be developed for those areas that have not attained the National Ambient Air Quality Standards. As part of these plans, the local air pollution control and air quality management districts have developed regulations limiting emissions from specific sources. The SCAQMD has adopted a variety of regulations that limit the emissions of various pollutants from many types of sources in the district. These rules are collectively known as "prohibitory rules," because they prohibit the construction or operation of a source of pollution that would violate specific emissions limits. The SCAQMD has adopted general and source-specific rules and regulations that apply to this project, which are discussed in the air quality technical appendix.

f. South Coast Air Quality Management Plan

In March 1989, the South Coast Air Quality Management District adopted an Air Quality Management Plan in accordance with federal Clean Air Act requirements, which mandate that areas not attaining ambient air quality standards prepare plans demonstrating attainment by December 31, 1987, or the earliest date practicable. Because the district has such a severe air quality problem, the earliest date by which the district has projected attainment with the federal ozone standard is 2010.

The attainment strategy relies on three "tiers" of regulatory proposals, each addressing emissions reductions from stationary sources, measures pertaining to the motor vehicle sector, and impacts from population growth in the region. The proposed measures are categorized into each tier depending upon how soon they can be implemented.

E. Land Use

1. Existing Land Uses

a. Eagle Mountain Mine/Mining

The Eagle Mountain Mine site is mostly disturbed land associated with the East Pit mine and the supporting railhead, truck roads, and ore processing area. A few buildings remain adjacent to the ore processing area at the south edge of the pit. The northern margins of the project area are undisturbed hill slopes.

The Eagle Mountain Mine is currently in a state of suspended operations after its closure in 1982. Data regarding geologic iron deposits at Eagle Mountain Mine in January 1983 (Kaiser Steel Resources 1990; SCS Engineering 1990), show that approximately 335 million tons of low-grade, iron bearing material exist in nine separate reserve areas at the mine. Of these geologic reserves, only approximately 170 million tons (0.45 percent of U.S. reserves) were considered to be economically recoverable at the time of mine closure. However, these iron ore deposits are not presently considered economically producible because of the high stripping ratios, low grade, increased transportation costs, small market and low-market value for iron ore, as well as the need for beneficiation facilities and infrastructure to support mining operations at the Eagle Mountain Mine. Geologic reserves exist in six discrete areas at Eagle Mountain. A detailed discussion of the mineral resources at the mine site may be found in the Geology section of this draft EIS/EIR.

Although Kaiser Steel Resources maintains a management office at Eagle Mountain, mining activities have essentially ceased. The East Pit is essentially inactive. An enormous coarse tailing hill dominates its southern rim, with an expanse of fine tailing settling ponds to the southeast. The ore crushing and concentrating facilities at the Eagle Mountain Mine have been dismantled for salvage, and the mining equipment has been sold. In addition, much of the infrastructure required to support the operation was completely abandoned in 1986 with the suspension of mining activities. Consequently, no concentration can presently be performed at this time. Prospecting activities for precious metals have been conducted in the East Pit area, but no commercially viable quantities of these mineral resources have been found (Anderson, Kaiser Steel Resources, 7/5/90).

Since closure of the Eagle Mountain Mine, resource production uses have been limited to sporadic shipments of previously stockpiled pelletized iron ore concentrates and rock products such as riprap, roadbase, and decorative and crushed rock, amounting to about 10,000 tons per year (Anderson, Kaiser Steel Resources, 11/7/89). These products have been shipped mainly by truck, the last rail shipment having been made in 1986.

b. FLPMA Railroad and Truck Road Right-of-Way Grant

The project includes the updating of the rail right-of-way granted to Kaiser Steel Resources for mining uses between Ferrum Junction on the northeast coast of the Salton Sea and the proposed project. The rail line is approximately 52 miles long, 32 miles of which exist on a legislatively authorized right-of-way. It was last used in 1986.

The existing Eagle Mountain Road from the I-10 interchange to the MWD pumping station will be widened to a 40-foot paved road and receive a FLPMA right-of-way. The total right-of-way being applied for is 110 feet wide to allow for the paved roadway, shoulders, and berms. This portion of the right-of-way is approximately seven miles long. The purpose of this road right-of-way is to serve as the main access route to the proposed landfill site.

The proposed Eagle Mountain Road Extension will begin just south of the MWD pumping station and will continue northeasterly at first and then northwesterly before heading northerly to an existing landfill haul road on-site. This partially existing dirt road is approximately 15 to 18 feet wide in most areas and is known locally as the Kaiser Truck Trail. This portion of the truck trail will be converted to a FLPMA right-of-way. The remainder of the Kaiser Truck Trail will be vacated.

c. BLM/Kaiser Steel Resources, Inc., Land Exchange

Under the Federal Land Policy and Management Act, BLM and Kaiser Steel Resources, Inc., will agree on those lands to be transferred to Kaiser in the land exchange. Land currently owned by Kaiser Steel Resources, Inc., will be offered in exchange for those selected lands.

Selected Lands

Under FLPMA, BLM will transfer approximately 3,271 acres of publicly owned lands in the Eagle Mountains (within the Eagle Mountain Mine site area) to Kaiser Steel Resources, Inc. These selected lands include both unencumbered parcels and lands with a variety of unpatented mining and millsite claims and the townsite area. Currently, no mining activity occurs on these lands.

Offered Lands

Offered lands are those Kaiser Steel Resources lands to be transferred to federal ownership. These are generally located along Salt Creek and the entire length of the Eagle Mountain rail line from Ferrum Junction (on the northeast coast of the Salton Sea) to Eagle Mountain (see Figures 5-10). These lands contain no known mineral resources and no mining activity occurs on them.

2. Surrounding Land Uses

The Eagle Mountain townsite (not a part of the project) is adjacent to the project area, south of the East Pit. The townsite is owned by Kaiser Steel Resources. The deed granting ownership includes a clause that title will revert to the BLM in the event the townsite is not used in support of mining. The existing town of Eagle Mountain consists of several hundred residences developed by Kaiser to house mine workers. Most of these single-family units are unoccupied. Several units are currently occupied by Kaiser employees, with additional units used in association with the state correctional facility and rented by others. Support facilities included a post office, store, and cafe, none of which are in operation, and two churches, which are no longer meeting. A landing strip is located adjacent to and east of the townsite. This landing strip was granted under a fee right-of-way pursuant to the Act of 6/18/1932 to the Metropolitan Water District on November 9, 1990. All of the townsite properties are under the control of Kaiser Steel Resources.

A state minimum security correctional return-to-custody facility (RTCF) for parole violators has been operating in Eagle Mountain since 1986 under a lease from Kaiser and a County Public Use Permit. This facility houses 271 inmates and has received approval to expand to 500 in facilities to be constructed in two phases.

The townsite is served by Kaiser Road, a county road, and all utilities and communications services, including cable television. A wastewater treatment plant is located southeast of the community. Its present capacity is 40,000 gallons per day; however, its potential capacity is 180,000 gallons per day. The on-site water system is supplied by a groundwater well. Since fluoride levels in this groundwater exceed drinking water standards, drinking water is transported weekly by truck from Blythe. A truck's capacity is 2,000 gallons. During the winter, the townsite, including the return-to-custody facility, uses approximately 3,000 gallons per week and during the summer approximately 4,500 gallons per week. These services are discussed in detail in the Utilities and Services section of this draft EIS/EIR.

Beyond the townsite, the East Pit mine and tailing areas, and the adjacent processing and railroad loading area, the margins of the project site are in essentially natural condition and serve a de facto open space and resource preservation function. The biology section of this draft EIS/EIR contains a discussion of the biological resources present.

The nearest residential uses beyond the townsite are scattered single-family homes about four miles to the southeast of Eagle Mountain and in the Lake Tamarisk and Desert Center areas approximately nine and ten miles southeast, respectively. The Lake Tamarisk development consists of about 70 privately owned single-family homes, two recreational lakes, a nine-hole golf course, a 150-space recreational vehicle park, and about 150 undeveloped lots owned by Kaiser Steel Resources. Desert Center has a number of single-family residences, most associated with nearby businesses. There are also two trailer parks in the area.

Commercial services and institutional land uses are found primarily in Desert Center, at the junction of Interstate 10 and State Route 177. A post office, two gas stations, three mini-markets, a cafe, a drive-in, and a bar provide services to the traveling public and residents of the area, including Eagle Mountain. There is also a County fire station, branch library, a telephone company office, and several churches. A senior center, recreation center, and pro shop associated with the golf course are located in Lake Tamarisk.

Resource production uses in the surrounding area include the Kaiser Steel holdings west of the project site, as well as other small claims farther west. The Central Pit and the Black Eagle pits are currently inactive, with some exploratory activity occurring sporadically in the area. There are several relatively small gravel pits located to the southeast between Eagle Mountain and Desert Center.

Some land east of Desert Center is used as irrigated cropland, producing mostly asparagus and jojoba, a shrub which produces an oil which is used in a number of products. The area is not mapped as Important Farmland by the State Department of Conservation or reflected as such in the General Plan (County of Riverside 1987:Figure VI.35). Approximately 994 acres within three agricultural preserves established under the Williamson Act are located near the town of Desert Center. In 1988 there were 4,913 acres of jojoba grown in the vicinity (County of Riverside 1988). However, this figure is dropping due to sporadic yields and other factors (Kaminskas, 11/8/89). Groundwater is pumped to irrigate these crops.

Recreational land uses in the area surrounding the project site include desert touring, shooting, hiking, wildlife viewing, or camping on large expanses of designated public lands administered by the BLM in the Eagle Mountains and Chuckwalla Valley. To the north, in the adjacent Pinto Basin portion of Joshua Tree National Monument, recreational use is restricted to winter backpacking. Recreational use is restricted or prohibited on much of the private mining and utility holdings in the area. There are no nearby areas for off-road vehicle use. The recreation vehicle park at Lake Tamarisk provides private recreational opportunities. A small public campground operated by the BLM is located in a palm oasis at Corn Springs, 15 miles southeast of Desert Center.

Transportation, utilities, and communications facilities crisscross the desert in the area surrounding Eagle Mountain. County-maintained paved roads are intersected by numerous dirt roads in the Chuckwalla Valley. A power transmission line and service road traverse the Coxcomb Mountains from the northeast to skirt the Eagle Mountains to the south. The Colorado River Aqueduct follows basically the same route and comes within a few hundred feet of the eastern edge of the project site in an open channel, before it flows into a tunnel and the Eagle Mountain pumping station. Gas, electric, and telephone lines also run along roads in the area. There are only a few jeep roads in the Eagle Mountains, which provide access to mining claims to the west and a radio tower adjacent to the project site on a nearby ridge.

Much of the rugged desert mountains and sweeping valley slopes surrounding the Eagle Mountain project site, if not utilized as noted above, are vacant and can be considered as serving open space and resource preservation functions.

3. Existing Land Use Plans and Policies on Project Site

The use of land on the project site is controlled by a number of plans and policies of the agencies discussed below.

a. County of Riverside

The Riverside County Comprehensive General Plan provides the primary vehicle for articulating local public land use policy on the non-federally managed lands of the project site. The General Plan is implemented by zoning districts, which regulate uses and establish land use standards. Certain uses are further regulated by use permits, which establish detailed conditions for operations of the regulated uses.

The General Plan is divided into topical elements, which each establish goals, policies, and objectives for development in unincorporated Riverside County. The Land Use Element divides the county into planning areas. Within the Chuckwalla Land Use Planning Area, the Eagle Mountain Mine site is further classified as the Eagle Mountain Planning Area. The proposed project falls within this sub-planning area. As indicated in the plan:

> Future land uses in this area should be open space and conservation land uses, with mining a possible use if the Eagle Mountain facility is reopened (County of Riverside 1987:98).

Using the Land Use Determination System established by the General Plan, the Open Space and Conservation Map indicates that the project area is currently designated Mineral Resources, Desert and Mountainous Areas, and Areas Not Designated As Open Space (ANDOS) (see Figure 14). The Mineral Resources, Desert, and Mountainous designations are classed as open space and conservation areas, and general policies for permitted land uses in these areas are found in the Environmental Hazards and Resources Element. It should be noted that some of the land covered by the General Plan is under federal ownership and open to other uses (such as mineral entry) than those designated by the County. Mineral Resources areas permit mineral production and related and compatible land uses which would preserve mineral production capabilities, with a minimum lot size of 20 acres (County of Riverside 1987:370, 401-403). Desert Areas permit open space and limited recreational uses, limited single-family residential uses (one dwelling unit per lot), landfills, compatible resource development, and governmental uses on lots of generally 10 acres in size. Mountainous Areas permit the same uses and densities, but are defined as having slopes in excess of 25 percent with no county road access or community water system (County of Riverside 1987:369).

Land uses in ANDOS are determined by review of the Environmental Hazards and Resources Element policies and composite maps, as well as considering the profile of the Eagle Mountain Planning Area, cited above. In addition, land use categories are established by the General Plan and used to evaluate the site for a final land use determination. The ANDOS in the project site are the ore processing area north of the truck road and west of the rail switching area. A review of these General Plan policies and intensity categories indicate an appropriate designation of this area to be Category IV - Outlying Area. Category IV areas are characterized as "self sufficient" in terms of public services, with basic road improvements, low residential densities, limited convenience commercial services, and potential for resource production and waste disposal as considered appropriate. Landfills are designated as acceptable land uses in this Category IV area (County of Riverside 1987:176).

The Comprehensive General Plan also contains a Solid Waste Element (pages 256-258.1). The objectives of this element are to provide adequate disposal capacity to accommodate existing and future solid waste generation, to minimize and mitigate the environmental impacts of these facilities, and to encourage waste management strategies to facilitate resource recovery in all new development proposals. The Solid Waste Element states that existing and proposed landfill sites established by the County Solid Waste Management Plan are to be shown on the General Plan Countywide Information Map of Public Facilities. As a part of the General Plan amendment, the public facilities map must be amended to indicate the Eagle Mountain landfill as a landfill site. A text land use standard states that all new proposals for solid waste disposal and/or resource recovery sites shall be consistent with the CoSWMP. The CoSWMP is discussed below.

General Plan land use policies are implemented by several zoning categories on the project site. Most of the former mining and processing areas of the site are zoned M-R-A (Mineral Resources and Related Manufacturing) (see Figure 15). This zone provisionally permits mining and related processing uses with the issuance of a permit under County Ordinance No. 555, implementing the State Surface Mining and Reclamation Act. In addition, this zone provides some performance standards concerning noise, road criteria, slopes, and other land use and operations considerations.

A small area north of Kaiser Road at the edge of the tailing hill is zoned W-2 (Controlled Development Area), permitting residential and light agricultural uses and certain recreational and institutional developments with a plot plan approval and, with a conditional use permit, limited mining and commercial/agricultural uses.

A very small part of the project site located west of the rail switching area is zoned N-A (Natural Assets). This zone is limited to single-family residential and recreational uses on 20-acre or larger parcels and, with a conditional use permit, limited commercial, recreational, and mining uses with a surface mining permit.

None of these zones permit a landfill on the project site. The only County zoning district which allows for "dump sites" (i.e., landfills) is in the M-H (Manufacturing-Heavy) zone, with a conditional use permit. This zone does not allow by right or by conditional use permit the type of mining operations currently permitted in the M-R-A zone.

In addition to the Comprehensive General Plan, a second County policy document contains added land use considerations. The Riverside County Solid Waste Management Plan implements land use considerations mandated by state law as it applies to the County. The CoSWMP includes the Eagle Mountain landfill project as a tentatively identified waste disposal site and states:

> Although the site has several attributes that favor development of such a facility and has been included herein as a tentatively identified landfill, before it can be developed considerable engineering, environmental, and economic studies must be completed and evaluated to determine that there will be no degradation of groundwater, or other adverse, irreversible environmental impacts (County of Riverside 1989:XI-28).

The CoSWMP also notes that pursuant to Title 7.3, Section 66780.2, of the Government Code, a tentatively identified site can be removed from the CoSWMP if Riverside County fails to make a finding that the site is consistent with the General Plan or has made a finding that the site should not be used for a solid waste management facility. A tentatively identified site may also be removed if the California Integrated Waste Management Board refuses to concur in the issuance of a solid waste facility permit for the site because of the County's failure to make the finding that the site is consistent with the General Plan. Further, siting approval by CIWMB requires a finding from the County that the distance from the solid waste facility to the nearest residential structures is in compliance with all of the state Minimum Standards for solid waste management and that the distance is sufficient to permit adequate control of noise, odor, nuisances, traffic, litter, and vectors (Section 66784.2).

b. Bureau of Land Management

Most of the desert land encompassing the project site and surrounding it in the Mojave and Colorado deserts is under federal jurisdiction and managed by the Bureau of Land Management. The California Desert Conservation Area Plan, approved by the U.S. Department of the Interior, Bureau of Land Management, in 1980, provides a comprehensive land use management plan for the 25-million-acre California Desert Conservation Area. Over 12 million acres in the CDCA are public lands.

The CDCA Plan was prepared pursuant to the Federal Land Policy and Management Act of 1976. Section 601 of the FLPMA requires that BLM develop a plan to ". . . provide for the immediate and future protection and administration of public lands in the California Desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." Section 103 of the FLPMA defines the terms "multiple use" and "sustained yield" as follows:

> The term "multiple use" means the management of public lands and their various resource values so that they are utilized in combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in the use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource values that takes into account the long-term needs of future generations for the renewable and non-renewable resources including but not limited to recreation, range, timber, minerals, water-shed, wildlife and fish, and natural scenic, scientific and historical values.
>
> The term "sustained yield" means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use.

The goal of the plan is to "provide for the economic, educational, scientific and recreational use of public lands and resources of the California Desert Conservation Area, in a manner which enhances, on balance, the environmental, cultural, and aesthetic values of the desert and its future productivity" (BLM 1980:5). There are four multiple use classes, as defined in the plan. The guidelines applicable to each multiple use class are listed in Table 12.

The plan designates federal land within and adjacent to the project site as Multiple Use Class M and the areas of the Eagle Mountains north and west of the East Pit as Class I (Figure 53). Multiple Use Class M (Moderate Use) provides for "a controlled balance between higher intensity use and the protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause." Multiple Use Class I (Intensive Use) provides for "concentrated use of lands and resources for human needs," but with "reasonable protection of sensitive natural and cultural values" and mitigation and rehabilitation "insofar as possible" (BLM 1980:13). Class I guidelines are less stringent concerning water quality, vehicle access, and recreational vehicle use than Class M guidelines cited in Table 12, but in other ways are identical with those of Class M.

Class L lands are managed for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. Class C multiple use is intended as a wilderness management designation which identifies areas "preliminarily recommended" as suitable for wilderness designation by Congress.

The waste disposal guidelines cited in Table 12, number 16, indicate that BLM-managed lands may not be used for waste disposal. This guideline would not preclude the use of the site for

TABLE 12
MULTIPLE USE CLASS GUIDELINES

	MULTIPLE-USE CLASS C Controlled Use (Wilderness Management) (Note: Class C identifies areas "preliminarily recommended" for wilderness designation by Congress. These guidelines summarize the kinds of management likely to be used in these areas after formal designation of wilderness by Congress.)	MULTIPLE-USE CLASS L Limited Use	MULTIPLE-USE CLASS M Moderate Use	MULTIPLE-USE CLASS I Intensive Use
1. AGRICULTURE	Agricultural uses (excluding livestock grazing) are not allowed.		Agricultural uses may be allowed on suitable land classified for these purposes. Prospective leases for potential desert crops, e g., jojoba, guayule or others, may be allowed only after NEPA requirements are met.	
2. AIR QUALITY	These areas will be managed to protect their air quality and visibility in accordance with Class II objectives of Part C of the Clean Air Act Amendments unless otherwise designated another class by the State of California (see 42 USC 7474, and the final regulations, if and when promulgated) as a result of recommendations developed by any BLM air-quality management plan.			
3. WATER QUALITY	These areas will be managed to maintain and enhance both surface- and ground-water resources.	Areas designated in these classes will be managed to minimize degradation of the water resources Best management practices, developed by the Bureau during the planning process outlined in the Clean Water Act, Section 208, and subsequently, will be used to avoid degradation and to comply with Executive Order 12088.		Areas designated in this class will be managed to minimize degradation of water resources Best management practices, developed by the Bureau during the planning process outlined in the Clean Water Act, Section 208, and subsequently, will be used to keep impacts on water quality minimal and to comply with Executive Order 12088
4. CULTURAL AND PALEONTOLOGICAL RESOURCES	Archaeological and paleontological values will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. A Memorandum of Agreement has been signed by the BLM, the California State Historic Preservation Officer, and for cultural resources the President's Advisory Council on Historic Preservation to protect cultural resource values.			
5 NATIVE AMERICAN VALUES	Native American cultural and religious values will be preserved where relevant and protected where applicable Native American group(s) shall be consulted. Memorandums of Agreement and Understanding have been signed between BLM and the Native American Heritage Commission pertaining to Native American concerns and cultural resources.			
6. ELECTRICAL GENERATION FACILITIES	Electrical generation plants are not allowed.	Electrical generation plants may be allowed (See wind/solar/geothermal, below.)	All types of electrical generation plants may be allowed in accordance with State, Federal, and local laws.	
		Existing facilities may be maintained and upgraded or improved in accordance with special-use permits or by amendments to rights-of-way.		
—Nuclear and Fossil Fuel Powerplants	Not allowed.		May be allowed in accordance with Federal, State, and local laws.	
—Wind/Solar Powerplants	Not allowed.	May be allowed after NEPA requirements are met.		
—Geothermal Powerplants	Not allowed.	May be allowed pursuant to licenses issued under 43 CFR Section 3250, et. seq. An EIS will be required.	May be allowed pursuant to licenses issued under 43 CFR Section 3250, et seq. NEPA requirements will be met.	

TABLE 12 (cont.)
MULTIPLE USE CLASS GUIDELINES

	MULTIPLE-USE CLASS C Controlled Use (Wilderness Management)	MULTIPLE-USE CLASS L Limited Use	MULTIPLE-USE CLASS M Moderate Use	MULTIPLE-USE CLASS I Intensive Use
7. TRANSMISSION FACILITIES	New transmission facilities for electricity, gas, water, and telecommunications are not allowed and new licenses or rights-of-way for these purposes will not be granted, except as provided for in the Wilderness Act of 1964—16 USC 1133(d)(4) or as may be specified by Congress.	New gas, electric, and water transmission and trans-desert telecommunications facilities may be allowed only within designated corridors (see Energy Production and Utility Corridors Element). NEPA requirements will be met.		
	Existing facilities may be maintained subject to Wilderness Management Plan.	Existing facilities within designated corridors may be maintained and upgraded or improved in accordance with existing right-of-way grants or by amendments to right-of-way grants. Existing facilities outside designated corridors may only be maintained but not upgraded or improved.		
—Distribution Facilities	New licenses or rights-of-way for distribution facilities to serve private properties will not be granted. Existing facilities may be maintained or improved but not expanded.	Existing facilities may be maintained and upgraded or improved in accordance with existing right-of-way grants		
		New distribution systems may be allowed and will be placed underground where feasible except where this would have a more detrimental effect on the environment than surface alignment. In addition, new distribution facilities shall be placed within existing rights-of-way where they are reasonably available.	New distribution facilities may be allowed and shall be placed within existing rights-of-way where they are reasonably available. NEPA requirements will be met.	
8. COMMUNICATION SITES	New communication sites are not allowed unless required for protection of wilderness values or visitors	New communication sites may be allowed in designated areas (see map in Utility Element). EA required.	New sites may be allowed. NEPA requirements will be met	
	Maintenance and operation of existing sites and facilities may be allowed subject to Wilderness Management Plan.	Existing facilities may be maintained and utilized in accordance with right-of-way grants and applicable regulations		
9. FIRE MANAGEMENT	Fire suppression measures will be taken in accordance with specific wilderness fire management plans to be followed by the authorized officer, and may include use of motorized vehicles, aircraft, and fire retardant chemicals.	Fire suppression measures will be taken in accordance with specific fire management plans subject to such conditions as the authorized officer deems necessary, such as use of motorized vehicles, aircraft, and fire retardant chemicals.		
10. VEGETATION —Harvesting (Native Plant)	Removal of vegetation, non-commercial, may be allowed by permit only after an EA or EIS is prepared and after development of necessary stipulations.	Removal of vegetation, commercial or non-commercial, may be allowed by permit only after NEPA requirements are met and after development of necessary stipulations.		
—Harvesting by Mechanical Equipment	Not Allowed.	Harvesting by mechanical equipment may be allowed by permit only.		
—Rare, Threatened, and Endangered Species, State and Federal	All state and federally listed species will be fully protected. Actions which may jeopardize the continued existence of federally listed species will require consultation with the U.S. Fish and Wildlife Service.			
—Sensitive Plant Species (Including candidates for listing by FWS, FWS Species of Concern, species on List 2, CNPS, 1980)	Identified sensitive species will be given protection in management decisions consistent with wilderness values and BLM policies	Identified species will be given protection in management decisions consistent with BLM policies.		

TABLE 12 (cont.)
MULTIPLE USE CLASS GUIDELINES

Vegetation (cont.) —Unusual Plant Assemblages (UPAs)	Identified UPAs will be given protection in management decisions consistent with wilderness values and BLM policies	Identified UPAs will be considered when conducting all site-specific environmental impact analyses to minimize impact. See also Wetland/Riparian Areas guidelines.	
—Vegetation Manipulation 1 Mechanical Control	Mechanical control will not be allowed		Mechanical control may be allowed, but only after consideration of possible impacts.
2 Chemical Control	Aerial broadcast application of chemical controls will not be allowed		
	Spot application will not be allowed.	Noxious weed eradication may be allowed after site-specific planning Types and uses of pesticides, in particular herbicides, must conform to Federal, State, and local regulations (see Vegetation Element).	Spot applications will be allowed after site-specific planning Types and uses of pesticides, in particular herbicides, must conform to Federal, State, and local regulations (see Vegetation Element)
3. Exclosures	Exclosures will not be allowed.	Exclosures may be allowed	
4 Prescribed Burning	Prescribed burning will not be allowed.	Prescribed burning may be allowed after development of a site-specific management plan	
11. LAND-TENURE ADJUSTMENT	Lands will be acquired, disposed of, or exchanged in accordance with FLPMA and other applicable Federal laws and regulations, to assure more efficient management of the public lands and to reduce conflicts with other public and private landowners to provide more consistency and logic in desert-wide land-use patterns.		
12. LIVESTOCK GRAZING	Grazing will be allowed subject to limitations to preserve wilderness characteristics and the protection of sensitive resources, except that existing grazing will only be subject to the protection of sensitive resources.	Grazing will be allowed subject to the protection of sensitive resources.	
	Major support facilities, such as permanent corrals, loading chutes, and significant water developments, will not be allowed except for existing facilities pursuant to valid existing leases, licenses, and permits. Maintenance of such facilities will be controlled to prevent unnecessary or undue degradation of wilderness values	Support facilities such as corrals, loading chutes, water developments, and other facilities, permanent or temporary, may be allowed consistent with protection of sensitive resources	Support facilities such as corrals, loading chutes, water developments, and other facilities, permanent or temporary, will be allowed
	Manipulation of vegetation by chemical or mechanical means will not be allowed	Manipulation of vegetation by chemical or mechanical means will not be allowed, except for site-specific needs. (See Vegetation Element)	Manipulation of vegetation by chemical or mechanical means may be allowed and may be designed, developed, and managed for intensive livestock use.

TABLE 12 (cont.)
MULTIPLE USE CLASS GUIDELINES

	MULTIPLE-USE CLASS C Controlled Use (Wilderness Management)	MULTIPLE-USE CLASS L Limited Use	MULTIPLE-USE CLASS M Moderate Use	MULTIPLE-USE CLASS I Intensive Use
13. MINERAL EXPLORATION AND DEVELOPMENT	These guidelines summarize the kinds of management likely to be used after formal designation of wilderness by Congress. Congressional enactment of wilderness will prescribe mining rules and possible cutoff dates for mineral entry. The information below indicates the possible restrictions after enactment. The following summarizes possible significant provisions of the Wilderness Act as it applies to mineral exploration and development after Congress officially designates the areas as wilderness. (For more detailed information, see the G-E-M Element or the Wilderness Act of Sept. 3, 1964). Minerals Prospecting and Exploration: Prospecting and exploration for the purpose of gathering information about mineral resources is allowed, provided such activity is carried on in a manner compatible with the preservation of the wilderness environment. Mineral Development: All designated wilderness areas may be withdrawn from mineral entry at sometime subsequent to Congressional designation. Following withdrawal, *no new mining claims* may be located, and no new permits, leases, or material sales contracts may be issued subject to deadlines established by Congress Valid existing mining operations may continue pursuant to submission and approval of operational plans which will prevent unnecessary or undue degradation of wilderness qualities.	*Leasable Minerals* Except as provided in Appendix 5.4, 516 DM 6, NEPA Procedures titled "Categorical Exclusions," prior to issuing any mineral leases, an environmental assessment will be prepared on the proposed mineral leasing action. As this class is an area of significant public concern, 60 days' public comment will be provided on the EA. An EIS will be prepared if the proposal would significantly impact the quality of the human environment and this should be expected in areas of especially sensitive surface resources. Mitigation measures as appropriate, subject to technical, ecological, wildlife, vegetation, and cultural values. Prior to any operations upon mineral leases, the operator shall submit the appropriate notices or applications to BLM or the U.S. Geological Survey (USGS), as appropriate, as specified in 43 CFR 3100, 3200, 3500. All applications submitted to the USGS shall be treated under existing joint BLM/USGS procedures (i.e., S.O. 2948) and other applicable regulations. Reclamation requirements are contained within these procedures. *Locatable Minerals* Location of mining claims is nondiscretionary. Operations on mining claims are subject to the 43 CFR 3809 Regulations and applicable State and local law. In most instances, plans of operation shall be required and treated as specified in the above regulation. An EA shall be prepared on the proposed plans of operations. As this class is a sensitive area of public concern, a 60-day public review period shall be held on all mining and reclamation plans filed in this class. BLM will review plans of operations for potential impacts on sensitive resources identified on lands in this class. Mitigation, subject to technical and economic feasibility, will be required.	*Leasable Minerals* Except as provided in Appendix 5.4, 516 DM 6, NEPA Procedures titled "Categorical Exclusions," prior to issuing any mineral leases, an EA will be prepared on the proposed leasing action. Mitigation measures will be required to protect sensitive scenic, ecological, wildlife, vegetative, and cultural values Prior to any operations upon mineral leases, the operator shall submit the appropriate notices or applications to BLM or the U.S. Geological Survey (USGS), as appropriate, as specified in 43 CFR 3100, 3200, 3500 All applications submitted to the USGS shall be treated under existing joint BLM/USGS procedures (i.e., S.O. 2948) and other applicable regulations Reclamation requirements are contained within these procedures *Locatable Minerals* Location of mining claims is nondiscretionary. Operations on mining claims are subject to the 43 CFR 3809 Regulations and applicable State and local law. In most instances, plans of operations shall be required and treated as specified in the above regulation. NEPA requirements will be met. BLM will review plans of operations for potential impacts on sensitive resources identified on lands in this class. Mitigation, subject to technical and economic feasibility, will be required	

TABLE 12 (cont.)

MULTIPLE USE CLASS GUIDELINES

Table 1 —*Multiple-Use Class Guidelines*—Continued

	MULTIPLE-USE CLASS C Controlled Use (Wilderness Management)	MULTIPLE-USE CLASS L Limited Use	MULTIPLE-USE CLASS M Moderate Use	MULTIPLE-USE CLASS I Intensive Use
Recreation (cont.)	—nature study and observation —photography and painting —rockclimbing —spelunking —hunting	these conditions will include, but are not limited to: -approved routes -no pitting, start, finish, or spectator areas.		cept where specific mitigations are stipulated by the authorized officer
	Permanent or temporary facilities for resource protection and public health and safety may be allowed at the discretion of authorized officer or in accordance with approved Wilderness Management Plans.	Permanent or temporary facilities for resource protection and public health and safety are allowed		
	Trails are open for non-vehicular use and new trails for non-motorized access may be allowed.			
16 WASTE DISPOSAL	Waste disposal sites will not be allowed in this class.	Hazardous waste disposal sites will not be allowed New non-hazardous waste disposal sites will not be allowed	Public lands managed by BLM may not be used for waste disposal (either hazardous or non-hazardous). Locations suitable for waste disposal, when found on BLM-managed public lands, will be transferred to other ownership through sale or exchange.* *This is the wording as amended on 1/15/87.	
17 WILDLIFE SPECIES AND HABITAT Rare, Threatened, and Endangered Species (both State and Federal)	All State and federally listed species and their critical habitat will be fully protected Actions which may affect or jeopardize the continued existence of federally listed species will require formal consultation with the U S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act			
—Sensitive Species	Identified sensitive species will be given protection in management decisions consistent with wilderness values and BLM policies.	Identified species will be given protection in management decisions consistent with BLM policies		
—Predator and Pest Control	Predator and pest control will not be allowed except to alleviate public health hazards or to protect endangered species.	Control of depredating wildlife and pests will be allowed in accordance with existing State and Federal laws		
—Habitat Manipulation	Projects to improve wildlife habitat may be allowed subject to environmental assessment.		Same as Classes C and L, except that chemical and mechanical vegetation manipulation may be allowed.	
—Reintroduction or Introduction of Established Exotic Species	Reintroduction of native species is allowed.	Reintroduction or Introduction of native species or established exotic species is allowed		
18 WETLAND/RIPARIAN AREAS	Wetland/riparian areas will be considered in all proposed land-use actions. Steps will be taken to provide that these unique characteristics and ecological requirements are managed in accordance with Executive Order 11990, Protection of Wetlands (42 CFR 26951), legislative and Secretarial direction, and BLM Manual 6740, "Wetland-Riparian Area Protection and Management" (10/1/79), as outlined in the Vegetation Element.			
19. WILD HORSES AND BURROS	Populations of wild and free-roaming horses and burros will be maintained in accordance with the Wild and Free-Roaming Horse and Burro Act of 1971 but will be subject to controls to protect sensitive resources as provided for in management plans for wilderness areas. (See Wild Horse and Burro Element)	Populations of wild and free-roaming horses and burros will be maintained in healthy, stable herds, in accordance with the Wild and Free-Roaming Horse and Burro Act of 1971 but will be subject to controls to protect sensitive resources. (See Wild Horse and Burro Element.)		

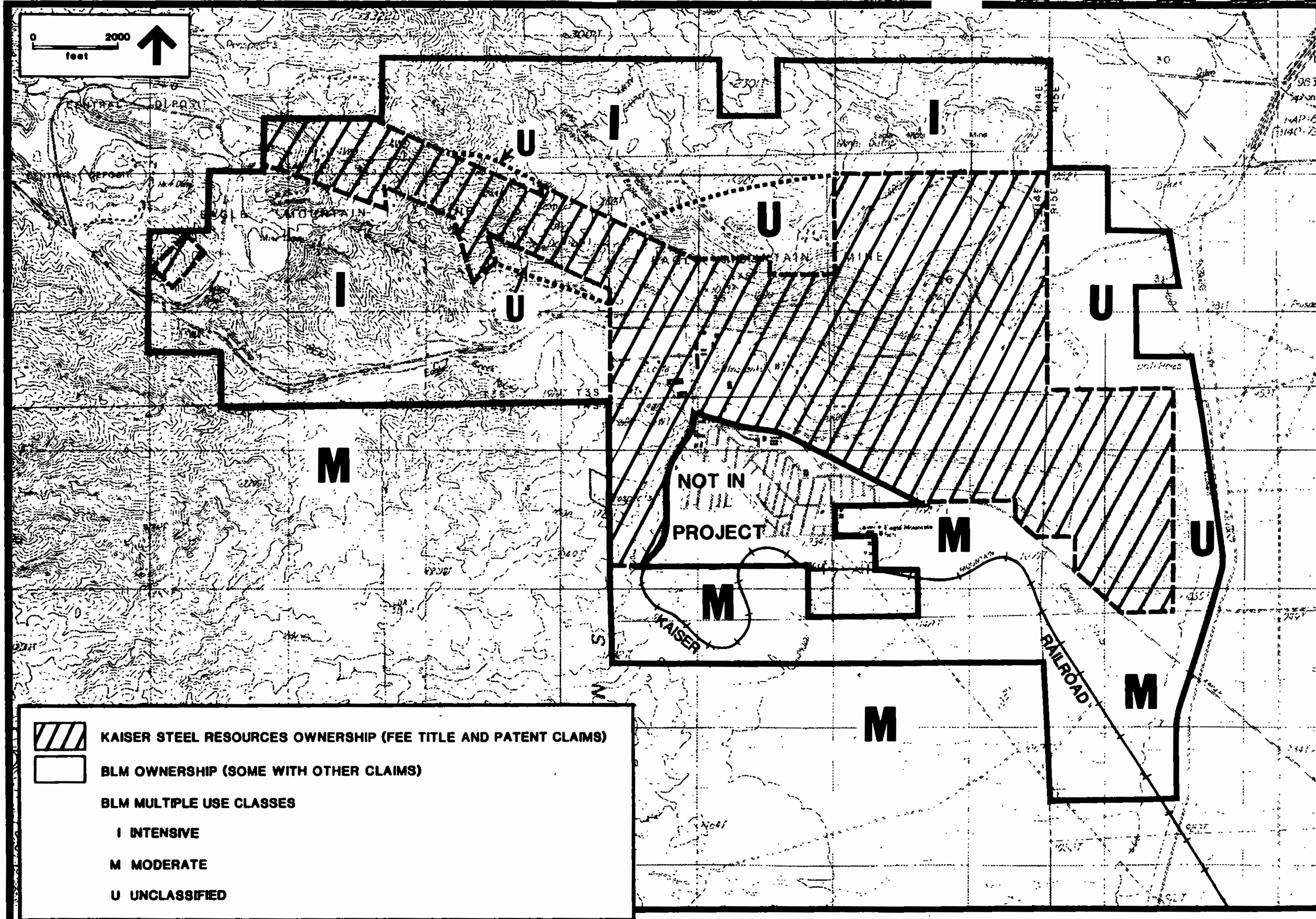


FIGURE 53. BLM MULTIPLE-USE CLASSES ADJACENT TO THE PROJECT AREA

RECON

2/91

TABLE 12 (cont.)
MULTIPLE USE CLASS GUIDELINES

		Saleable Minerals Except as provided in Appendix 5.4, 516 DM 6, NEPA procedures titled "Categorical Exclusions," for new sites less than 5 acres in size, an EA shall be required for all material sales locations, including sand and gravel. For new sites greater than 5 acres, or in sites less than 5 acres where the EA indicates a significant level of adverse impacts, an EIS shall be required	*Saleable Minerals* Except as provided in Appendix 5 4, 516 DM 6, NEPA Procedures titled "Categorical Exclusions," new material sales locations, including sand and gravel sites, will require an EA.	
		Continued use of existing areas of sand and gravel extractions is allowed subject to BLM permits, as specified in 43 CFR 3600.		
14 MOTORIZED-VEHICLE ACCESS/ TRANSPORTATION	Motorized-vehicle use is generally not allowed unless provided for in individual wilderness legislation and management plans or if necessary to serve valid existing rights, and for emergency use for public safety, or protection of wilderness values	New roads and ways may be developed under right-of-way grants or pursuant to regulations or approved plans of operation Motorized-vehicle use is allowed on "approved" routes of travel. This means that "existing" routes of travel are closed unless specifically designated "open "	Motorized-vehicle use will be allowed on "existing" routes of travel unless designated closed by the authorized officer. New routes may be allowed upon approval of the authorized officer.	Same as Class M In addition, the vehicle open areas are available for unrestricted vehicle access (see Recreation Element)
		Vehicle use on some major dunes and dry lakebeds may be allowed (see Motorized-Vehicle Access Element)		
		Periodic or seasonal closure of routes of travel may be required.		
	Compliance with Executive Orders 11644 and 11989 as applied to motorized-vehicle access will be assured.			
—Railroads	No new railroads and trams will be allowed. Existing railroads and trams may be operated and maintained subject to nonimpairment of wilderness values.	Railroads and trams may be allowed to serve authorized uses if no other viable alternative is possible.	Railroads and trams may be allowed	
—Aircraft	Aircraft facilities are not allowed.	Temporary landing strips may be allowed by permit.	Airports and landing strips may be allowed by lease subject to conformance with county or regional airport plans and FAA and DOD approval	
15 RECREATION	This class is suitable for nonmechanical types of recreational experience which generally involve low to very low user densities. Recreational opportunities provided include, but are not limited to, the following characteristic activities: —backpacking —primitive, unimproved site camping —hiking —horseback riding —rockhounding	This class is suitable for recreation which generally involves low to moderate user densities. Recreation opportunities include those permitted in Class C plus: -land-sailing on dry lakes -non-competitive vehicle touring and events only on "approved" routes of travel All organized vehicle events, competitive or not, require a permit specifying the conditions of use;	This class is suitable for a wide range of recreation activities which may involve moderate to high user densities. Recreational opportunities include those permitted in Class L. Competitive motorized-vehicle events are limited to "existing" routes of travel and must be approved by the authorized officer. Pit, start, and finish areas must be designated by the authorized officer. All competitive events and organized events having 50 or more vehicles require permits	This class is suitable for recreation activities which generally involve high user densities A wide array of recreational opportunities will be found in this class Off-road-vehicle play will be allowed where approved in open areas. Uses permitted are the same as Class M, in addition, motorized vehicle play is allowed in areas designated "open " All aspects of competitive events will be permitted ex

landfilling provided that BLM transfers out of public ownership lands on the project site to private ownership and provided that the project is implemented in a manner consistent with the air quality, water quality, cultural and paleontological, Native American, vegetation, wildlife, and fire suppression guidelines cited above.

Within the CDCA is a management program which addresses special areas. These areas are called Areas of Critical Environmental Concern (ACEC) and are identified in Figure 3. The FLPMA, in Section 103(a), defines an ACEC as an area ". . . within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards." The Chuckwalla Bench ACEC, located in the southeastern portion of the CDCA (see Figure 3), was established to manage an area of high-density desert tortoise habitat. Approximately 11.5 miles of the Eagle Mountain rail line pass through the Chuckwalla Bench ACEC and 2.5 miles pass through the Salt Creek ACEC.

4. Existing Land Use Plans and Policies in Surrounding Areas

The use of land which surrounds the project site is controlled by a number of plans and policies of the agencies discussed below.

a. County of Riverside

Within the Chuckwalla Land Use Planning Area, power plant development, highway commercial services, rail transportation, and availability of irrigation water are identified as area characteristics. Constraints to land use in the area are identified as its remote location, lack of infrastructure, large expanses of desert held by the BLM, and the Kaiser mine closure. The Desert Center/Lake Tamarisk area is identified and land use policies related to continuance of existing conditions are provided. The Open Space and Conservation Map indicates that the area surrounding Eagle Mountain is currently designated Mineral Resources, Desert Areas, and Mountainous Areas, and ANDOS (see Figure 14). The ANDOS extend over the entire townsite area, including all land north of the rail line loop adjacent to the south boundary of the project site.

Also, within the townsite, a Public Use Permit has been approved by the County to allow the operation of a State Department of Corrections return-to-custody facility under private contract management for rehabilitation of adult parole violators. The facility is located on 11.9 acres at the northwest corner of Highland Drive and Court Street and houses 271 inmates, but has approval for 200 more inmates in second-phase construction and an additional 100 inmates in a third-phase program. Inmates are housed in existing and converted structures totaling 70,000 square feet at buildout. The facility includes dormitories, classrooms, food and health services, and workshops and is linked to the utilities and services available to the townsite. The Public Use Permit establishes conditions for operation, including reestablishment of fire services in Eagle Mountain.

b. Bureau of Land Management

Multiple Use Class L (Limited Use) is intended to protect sensitive, scenic, ecological, and cultural resource values. Public lands designated Class L are managed for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished. Compared to the Class M guidelines cited above, Class L operates under the same air quality, water quality, cultural and paleontologic, Native American, fire management, vegetation, mineral exploration and development, waste disposal, and wildlife species and habitat guidelines as Class M. In addition, Class L guidelines allow for the use of railroad and trams to serve authorized uses if no other viable alternative is possible. Railroads and trams may be allowed on Class M and I lands.

Multiple Use Class C (Controlled Use) is intended as a wilderness management designation which identifies areas "preliminarily recommended" as suitable for wilderness designation by Congress. This classification also provides management guidelines to insure preservation of wilderness characteristics until such a congressional designation is made. These guidelines restrict grazing, vehicle access, and most kinds of facility development.

The area is also part of a larger bill currently being considered by Congress to enlarge Joshua Tree National Monument and change its status to a National Park. Under this proposed legislation, the Eagle Mountain wilderness study area would be transferred to the National Park Service and given Wilderness Area status, to be managed in a way similar to that of the existing Pinto Basin Wilderness Area to the north (see discussion under National Park Service below). Figures 54 and 55 show the two alternative boundary adjustment proposals for enlarging Joshua Tree National Monument.

Independent of this proposed legislation, portions of the northwest slopes of the Eagle Mountains bounded on the north and west by Joshua Tree National Monument are being proposed for a boundary adjustment, involving administrative transfer of land from the BLM to National Park Service jurisdiction as an addition to the monument. Figures 54 and 55 show the Pinto Basin boundary adjustment proposal and an Eagle Mountains alternative being considered by these federal agencies (BLM 1988:2-14, 2-23).

c. National Park Service

The project site is located about a mile and a half south of the boundary of Joshua Tree National Monument. This large and popular desert park is administered by the National Park Service

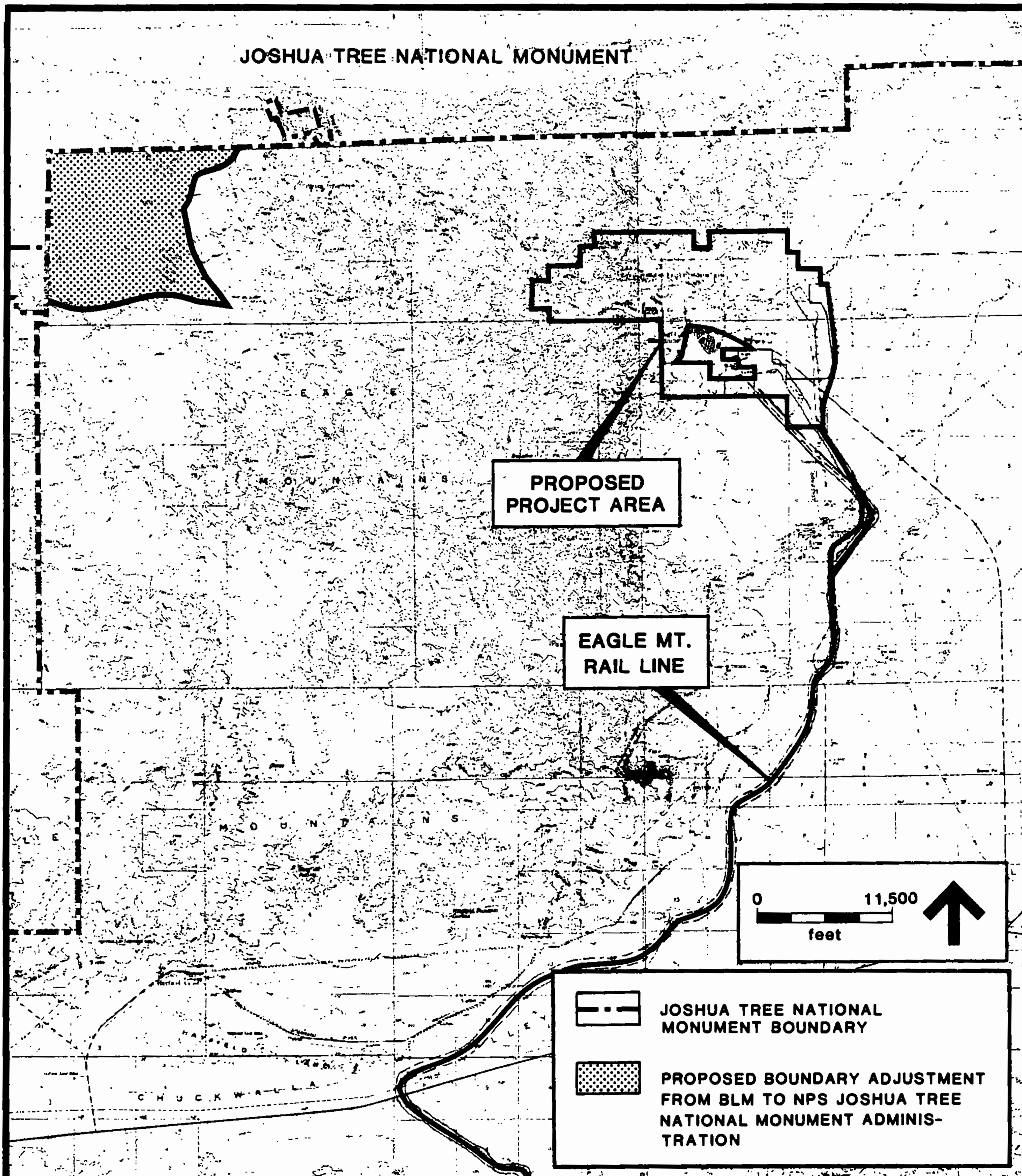


FIGURE 54. "PINTO BASIN" ADJUSTMENT PROPOSAL

RECON

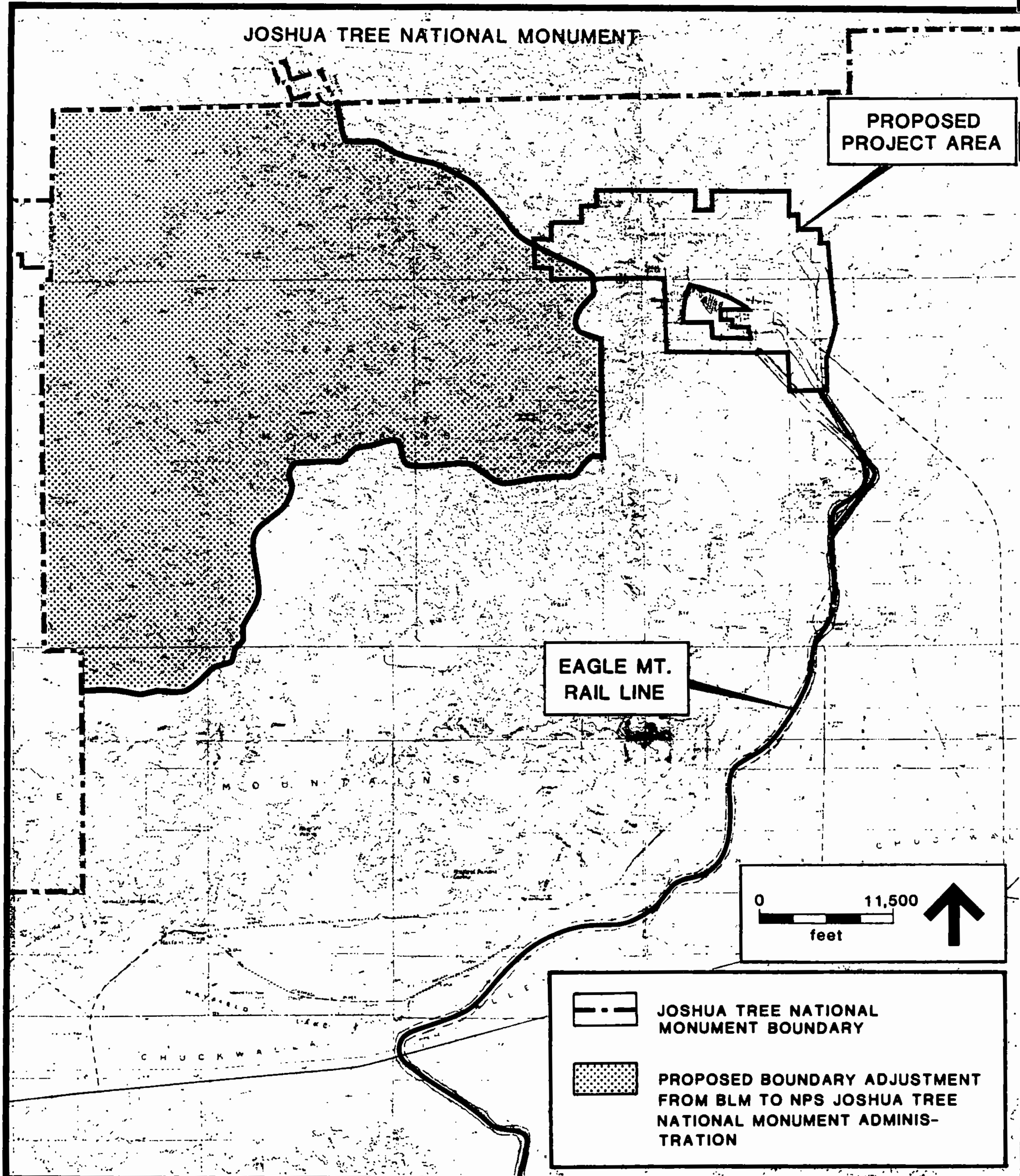


FIGURE 55. "EAGLE MOUNTAINS ALTERNATIVE" BOUNDARY ADJUSTMENT PROPOSAL

RECON

(NPS), U.S. Department of the Interior. Joshua Tree National Monument was established by proclamation August 10, 1936, to preserve a representative and scenic portion of the Mojave and Colorado deserts for the benefit and enjoyment of present and future generations. The Statement for Management, approved in 1978, establishes land management policies and objectives for the monument.

The part of the monument in proximity to the project site is designated as a Natural Environment and Wilderness Subzone. Lands within the Natural Environment Subzone (two percent of adjacent lands) are to be managed as follows: "The natural resources and natural processes remain largely unaltered by human activity except for approved developments essential for management, use and appreciation. Developments are limited to park roads, picnic areas, backcountry parking areas, and three borrow pits." Lands within the Wilderness Subzone (98 percent of adjacent lands) also remain largely unaltered by human activity except for 1.5 miles of dirt service road. No other development is allowed. For further discussion of Wilderness Subzone see the Visual, Recreation, and Wilderness Resources section of this draft EIS/EIR.

d. Metropolitan Water District

Management of the Colorado River Aqueduct, which runs adjacent to the project site, is by the Metropolitan Water District. The primary policy mandate which guides MWD operations is the continued delivery of high-quality water for domestic use by its member agencies and the population of much of the Los Angeles and San Diego areas.

F. Surface Drainage/Flooding

The proposed project is located in an arid climate where normal annual rainfall is approximately three inches per year. However, the storm weather pattern is sometimes characterized by heavy rains of short duration. Figure 56 shows the total area of the watershed, about 6,400 acres, which consists mainly of undeveloped areas sparsely covered with desert vegetation such as chaparral and sage. The topography is predominantly mountainous with steep slopes and vertical cliffs. The overall drainage flow pattern is from west to east.

Several normally dry creek beds exist in the surrounding area. Typically, water is present in these drainage courses only during or shortly after rain events. Most of the area drains to Eagle Creek, a large dry creek bed on the southeastern side of the proposed site. Eagle Creek originally drained southeasterly through the town of Eagle Mountain to an outlet area at the intersection of Yucca Drive and Kaiser Road. The flood control system through the town still exists and consists of the following improved and unimproved flow paths:

1. An unlined channel adjacent to and on the south side of the electrical substation.

2. A bridge at the rail crossings just downstream of the electrical substation.

3. An unlined channel on the eastern side of the private road. Some sections of this channel are well defined and include ungrouted riprap embankments, while other sections are poorly defined and have no embankments.

The unimproved areas include a natural creek bed upstream of the electrical substation, and an area of probable sheet flow between the railroad bridge and the private road. Drainage flows leave the developed area on the eastern side of the private road and travel over the county/private road fork. No obstructions or improvements exist in the drainage flow path for several thousand feet. A private aircraft landing strip and the underground Colorado River Aqueduct with its adjacent access road are the only improved areas further to the east.

After a heavy storm in 1976, the Kaiser Mining Company built a dike across the Eagle Creek flow line near the mouth of the confluence with an unnamed tributary of Eagle Creek. The purpose of the dike was to protect the mine processing plant and town areas by forcing flows to the northern side of the main haul road and into the East Pit. During a heavy storm in 1978, the rainwater drained into the East Pit rather than through the town. Although the portion of the dike across the main haul road has been removed, the mouth of the major drainage confluence is still filled. The creek neck, downstream from the dike, has also been filled.

During storms under existing conditions, Eagle Creek flows will cross to the north side of the main haul road at the mouth of the major confluence and continue in a downstream manner, either in or adjacent to the northern road edge. Presently, water drains into the East Pit.

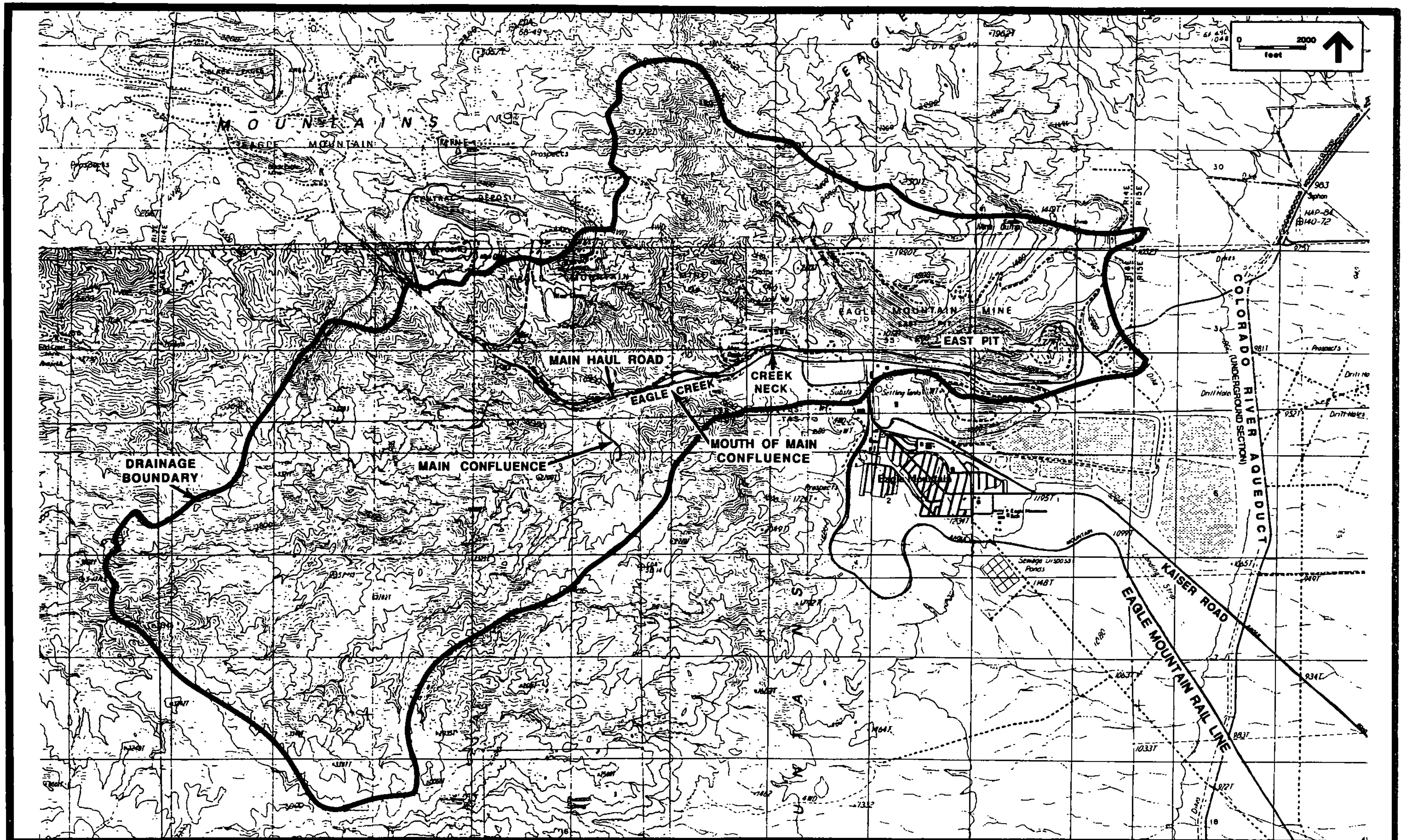


FIGURE 56. EAGLE MOUNTAIN DRAINAGE AREA

G. Biology

A biological survey of the Eagle Mountain landfill project site, including the Eagle Mountain rail line right-of-way and truck route corridors proposed for access to the project site, was conducted in October and November, 1989, and January and June, 1990 (a total of 69 person-days). Two special surveys were conducted for desert pupfish and sensitive bats in May and June 1990. The surveys for desert pupfish were conducted by the California Department of Fish and Game. A second bat survey for winter roost sites was carried out in November and December of 1990. A complete biological technical report on the proposed project is included as Appendix F.

This biology section summarizes the technical report and covers existing biological resources and the ecology of the Eagle Mountains and the desert along the Eagle Mountain rail line right-of-way. Sensitive resources not observed but which could occur on the site are included in the discussion. Impacts and mitigations to biological resources from the proposed project are discussed under Section IV.G. of this document.

1. Existing Conditions

a. Vegetation

The project is located within the transition zone between the Mojave and Colorado deserts (a division of the Sonoran Desert). Three vegetation types occur within the survey limits of the project: Sonoran creosote bush scrub, desert dry wash woodland, and desert chenopod scrub. The most prominent community type represented in the study area is the Sonoran creosote bush scrub. This vegetation type is common on nearly all the lower slopes, bajadas, and sandy flats. A small freshwater marsh occurs along the railroad.

Figures 57a through 57e show the existing vegetation along the Eagle Mountain rail line and on the Kaiser Steel Resources properties to be offered in the land exchange. Figures 58a and 58b show the existing vegetation along Eagle Mountain Road, its proposed extension, and the spur area to the Phase II container handling yard. Figure 59 shows the existing vegetation on the Eagle Mine property.

In the project area, creosote bush scrub varies in density and dominance of species depending upon two topographic features, the steep rocky slopes of the desert mountains and the flat areas of desert pavement. The steep rocky slopes of the Eagle Mountains, Orocopia Mountains, and Chocolate Mountains have lower densities of the common shrubs as the terrain becomes steeper and rockier. The lower density of shrubs is a direct result of the depth and availability of soil, which decrease as rockiness increases. Desert pavement areas also lack sufficient soil to support many species. Pavement areas are characterized by the presence of a flat, stony surface

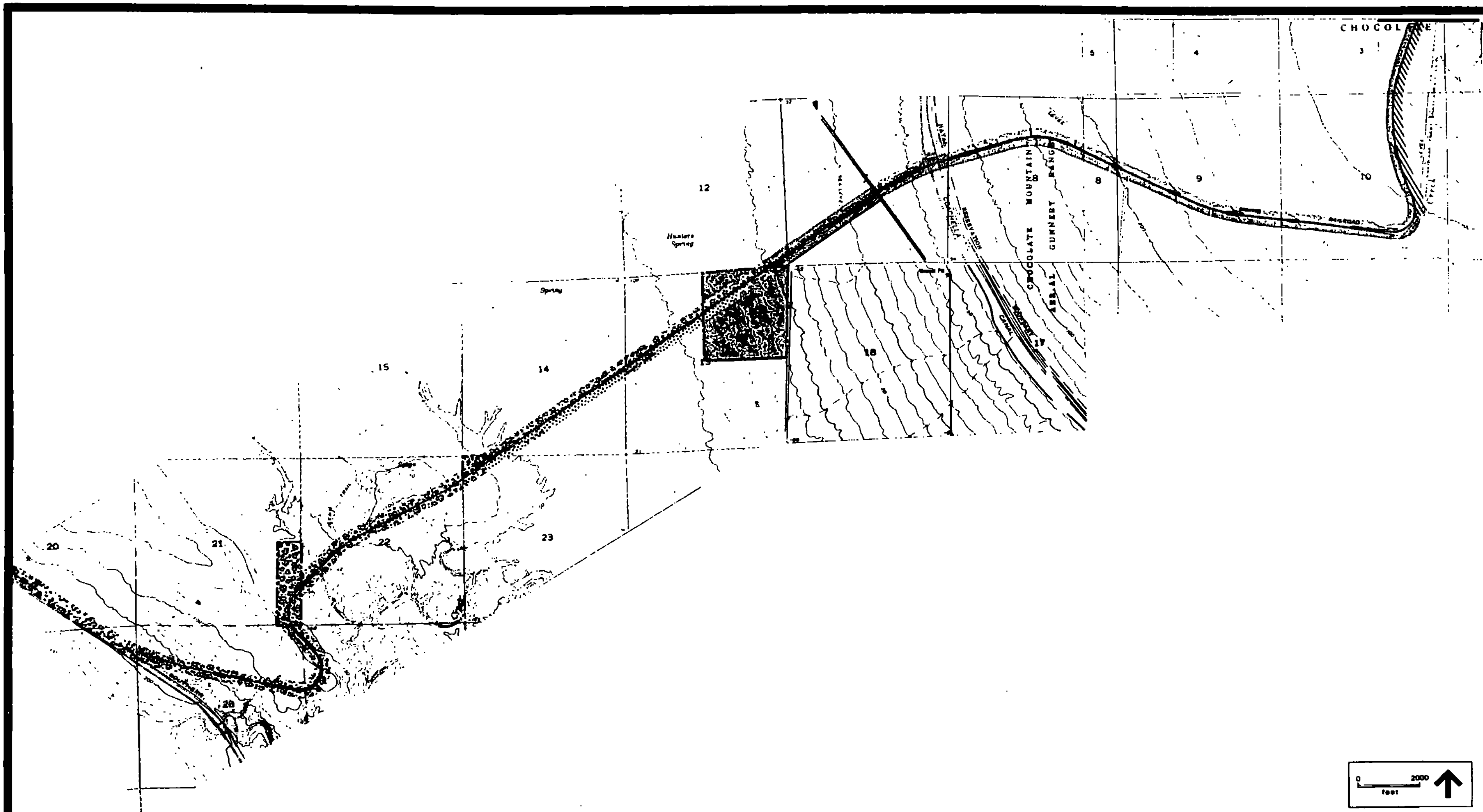


FIGURE 57a. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 1 OF 5

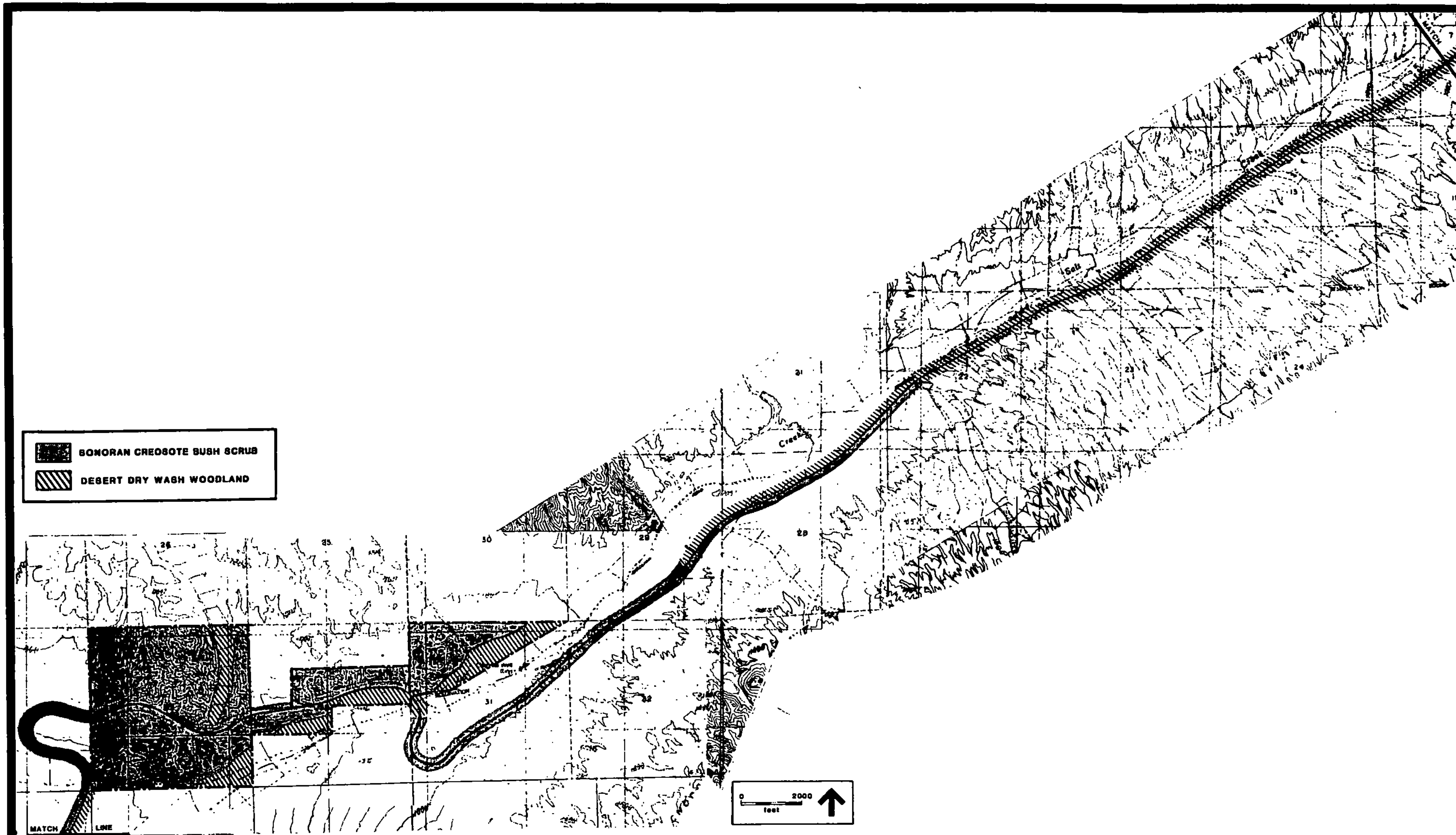


FIGURE 57b. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 2 OF 5

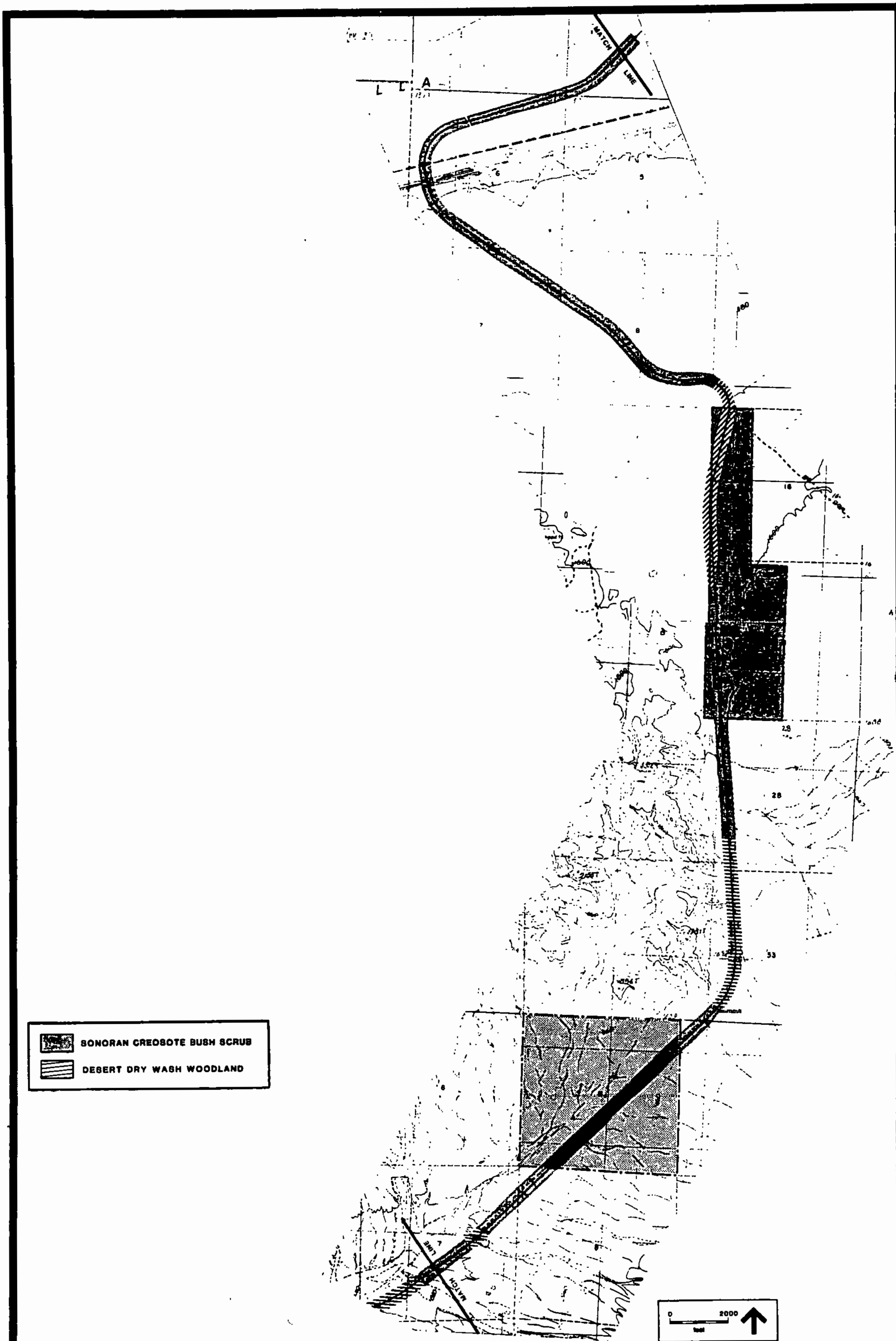


FIGURE 57c. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 3 OF 5

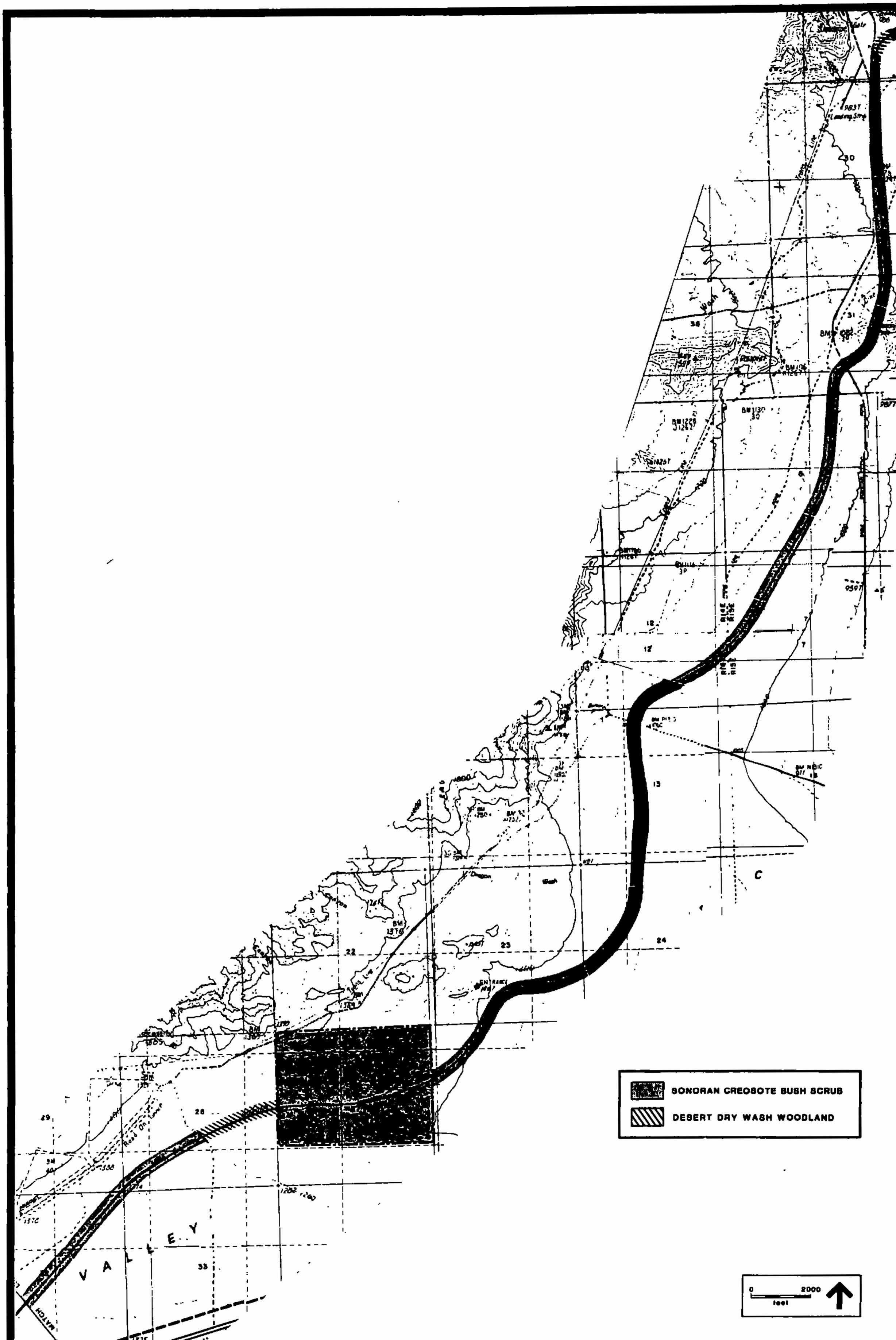


FIGURE 57d. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 4 OF 5

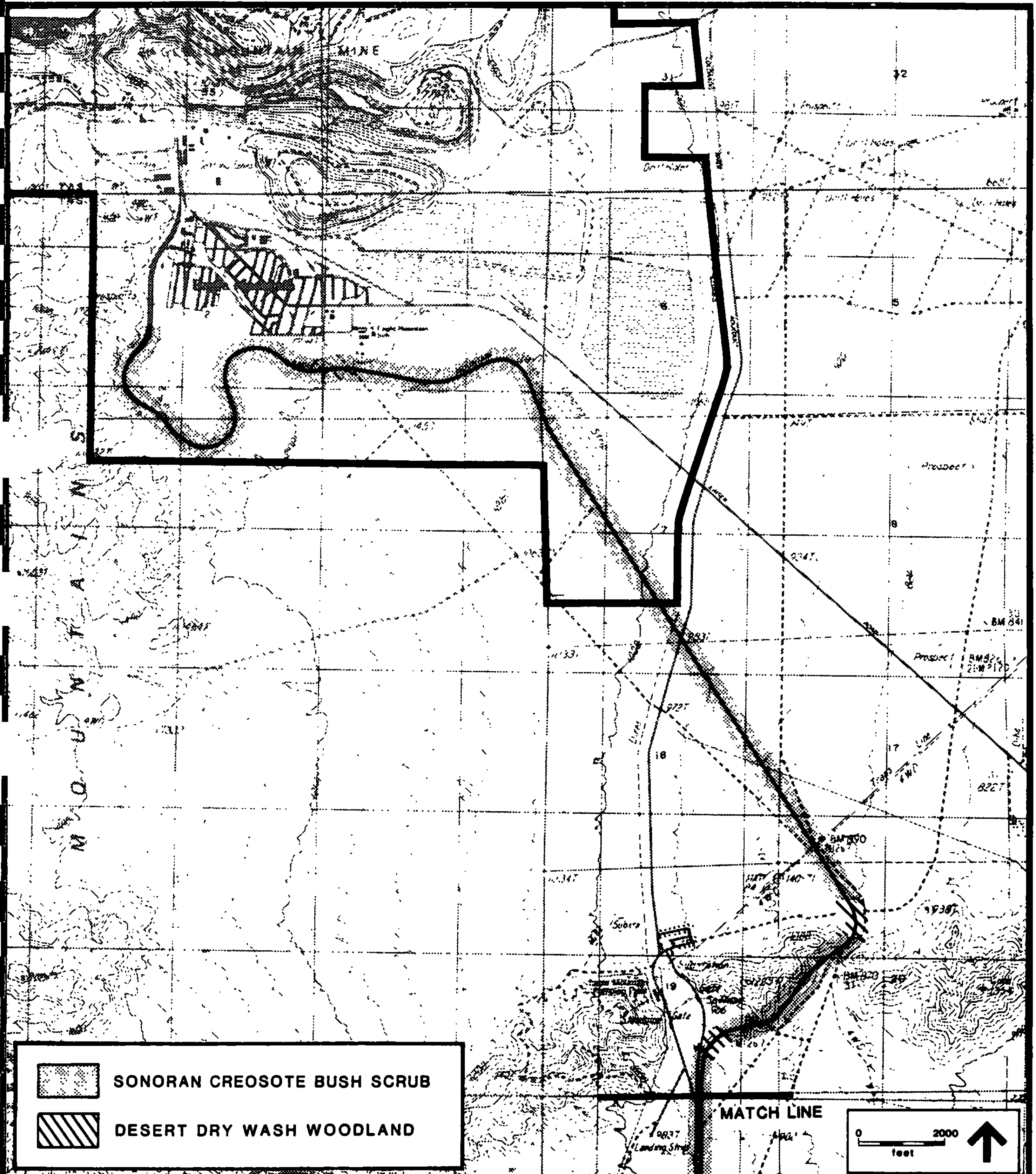


FIGURE 57e. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 5 OF 5

RECON

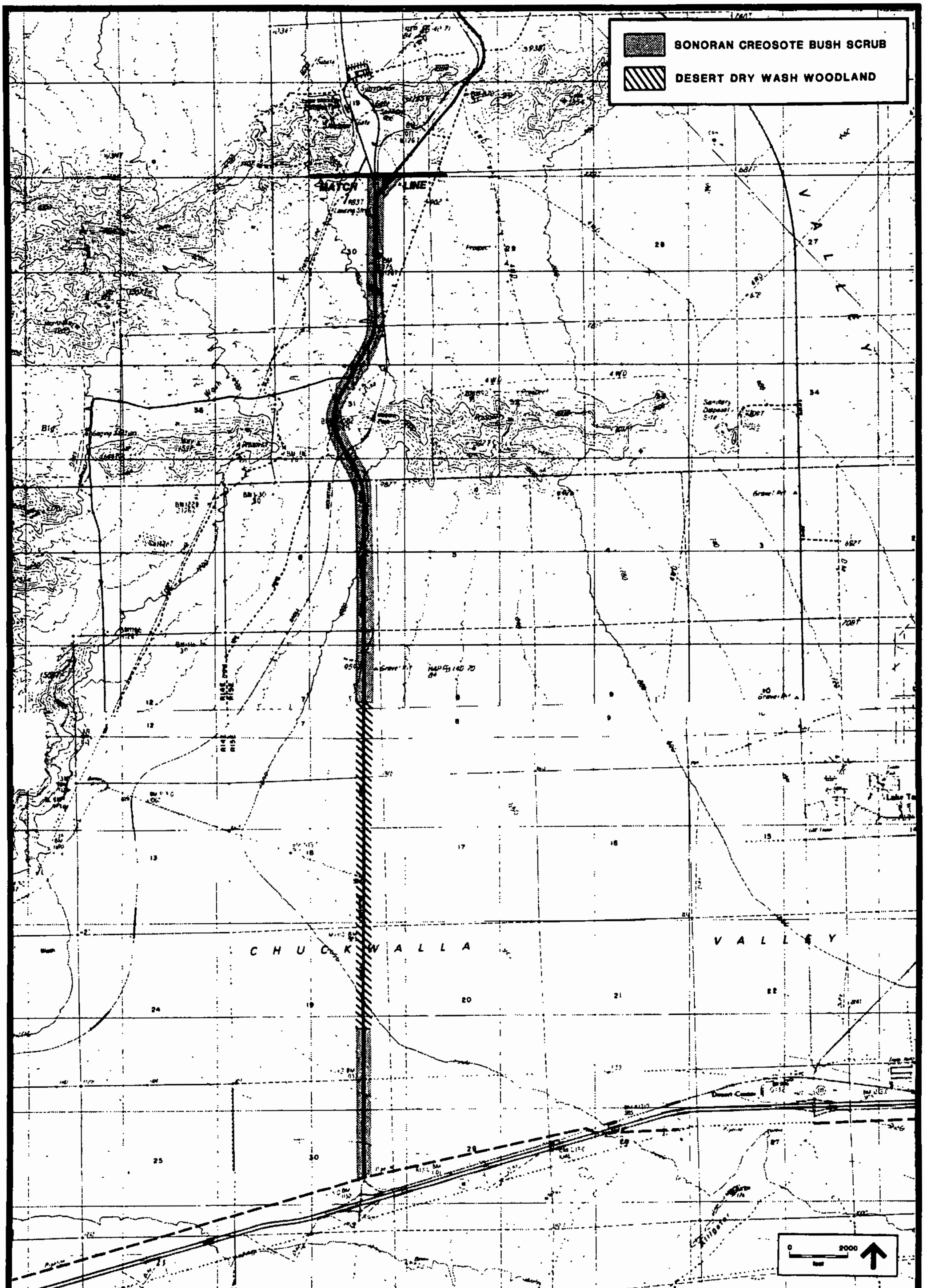


FIGURE 58a. EXISTING VEGETATION ON EAGLE MOUNTAIN ROAD AND SPUR LOCATION
MAP 1 OF 2

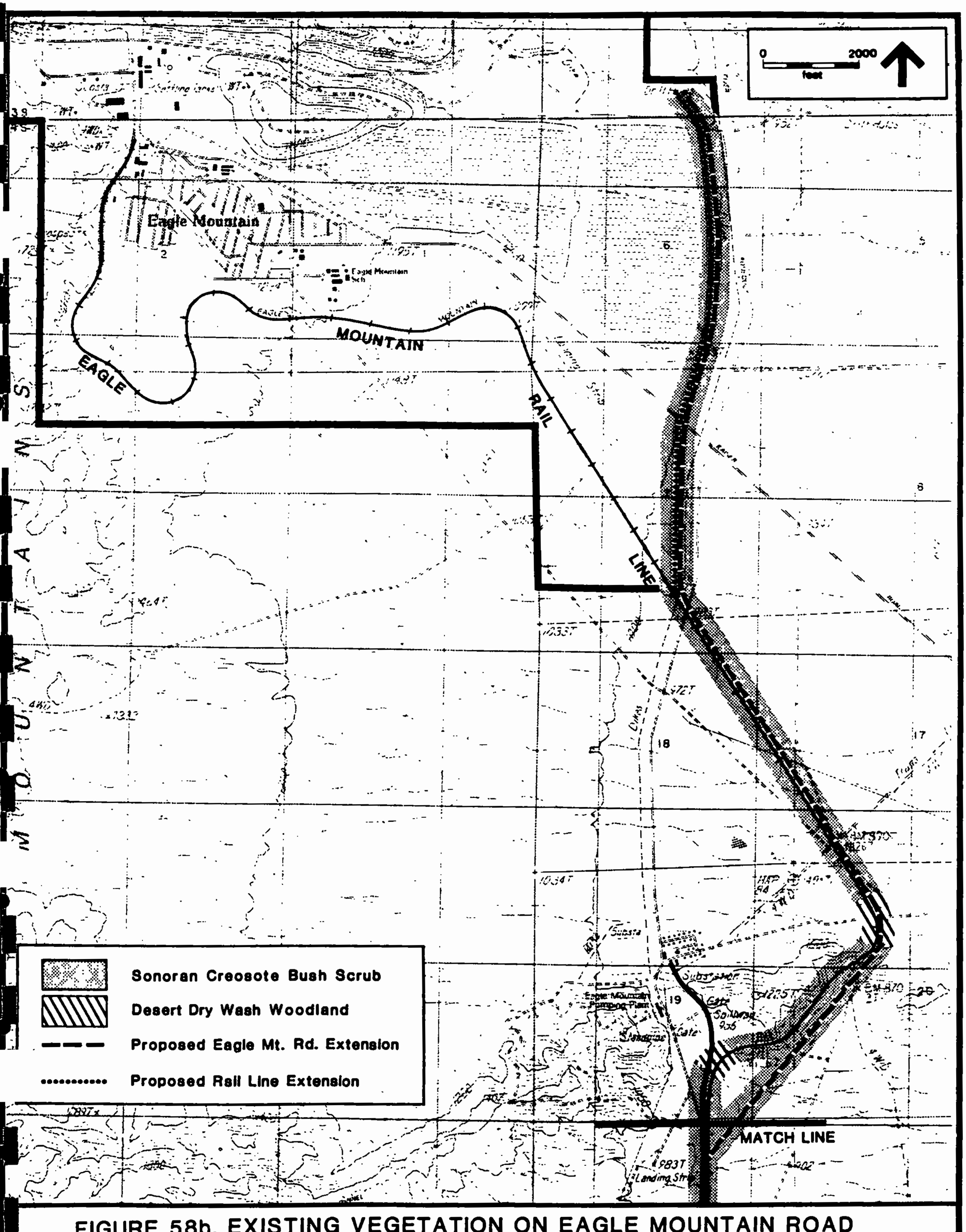


FIGURE 58b. EXISTING VEGETATION ON EAGLE MOUNTAIN ROAD EXTENSION AND RAILROAD SPUR MAP 2 OF 2

RECON

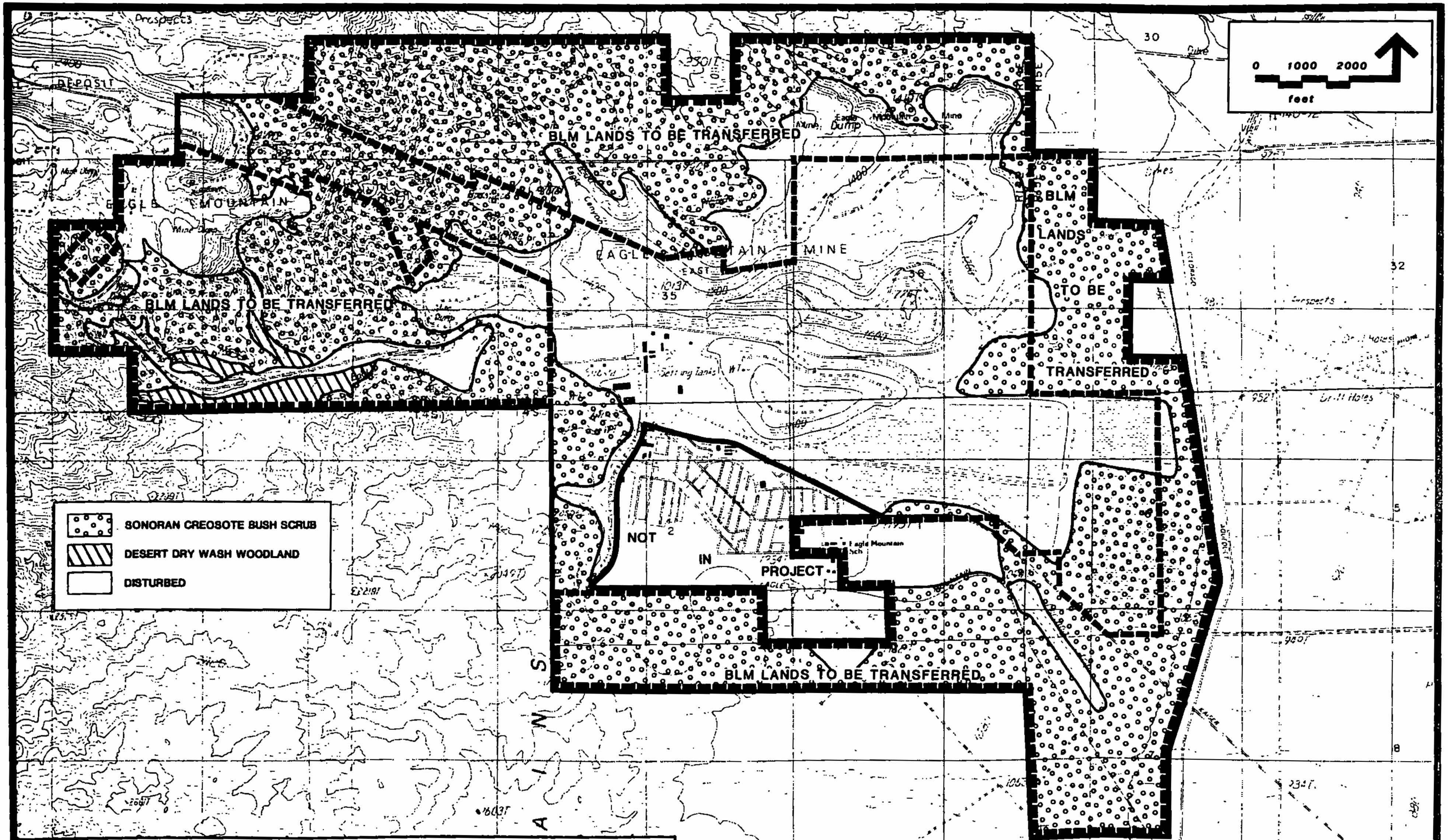


FIGURE 59. EXISTING VEGETATION ON THE PROPOSED EAGLE MOUNTAIN LANDFILL PROJECT SITE

that has developed a "desert varnish" on the rocks due to long exposures to the desert sun and heat. Soils are typically shallow beneath the rocky surface and plants such as creosote are often stunted when growing in pavement areas. Washes that occur in desert pavement landscapes have deeper soils and thus are able to support larger and more diverse plants.

The many washes and drainages dissecting the bajadas typically support a variety of desert tree species. Desert dry wash woodland vegetation is best exemplified in Salt Creek along the Eagle Mountain rail line north of the Coachella Canal.

The vegetation in washes and drainages changes as the elevation drops below sea level south of the Coachella Canal towards the Salton Sea. The soils in this area become increasingly alkaline, limiting the distribution of the more common wash species. The lower portions of the bajada from just below sea level to the Salton Sea are vegetated with alkali- and salt-tolerant chenopod scrubs. Desert chenopod scrub occurs as a gradient of plant communities that coincides with the increasing salinity and alkalinity of the soils. The plant communities of the desert chenopod scrub range from desert saltbush scrub at elevations near sea level to desert sink scrub in the wet alkaline sink areas below sea level.

Freshwater marsh vegetation occurs within the railroad right-of-way south of Coachella Canal (see Figure 57a), including the area in Salt Creek under the trestle. This community is found along a continuous, parallel, 3.5-mile stretch of railroad from the Hunter's Spring area to the Salt Creek railroad trestle.

b. Dominant Plants

The most prominent community type represented in the study area is the Sonoran creosote bush scrub common on nearly all the lower slopes, bajadas, and sandy flats in the project study area. The dominant plant in the community is the creosote bush (*Larrea tridentata*). Creosote bush was observed in monotypic stands in some areas throughout the project area; however, it was commonly associated with two other shrub species, cheese-bush (*Hymenoclea salsola*) and bur-sage (*Ambrosia dumosa*). Smaller subshrubs found in spaces between the dominant shrubs include desert straw (*Stephanomeria pauciflora*), sweet bush (*Bebbia juncea*), jojoba (*Simondsia chinensis*), white and little-leaved ratany (*Krameria grayi* and *K. parvifolia*, respectively), and shad scale (*Atriplex canescens*).

The lower bajadas and flats within this community type had a greater abundance of cactus species than the Salton Sink or steep rocky slopes of the Eagle Mountains. The most common species of cacti observed are the golden cholla (*Opuntia echinocarpa* var. *echinocarpa*) and pencil cholla (*Opuntia ramosissima*). Beavertail cactus (*Opuntia basilaris*), hedgehog cactus (*Echinocereus engelmannii*), and cottontop cactus (*Echinocactus polycephalus*) also occur in the area, but at much lower densities.

Small areas of Sonoran mixed woody and succulent scrub occur within the area mapped as creosote bush scrub. These localized areas are more common in areas halfway between the Eagle Mountain Mine and the Salton Sea adjacent to Eagle Mountain rail line. This community type is recognized by the presence of larger numbers of individuals of the following species: ocotillo (*Fouquieria splendens*), golden cholla, pencil cholla, Mohave yucca (*Yucca schidigera*), and catclaw shrubs (*Acacia greggii*).

The most common tree species found in the large washes are the smoke tree (*Dalea spinosa*), palo verde (*Cercidium floridum*), and ironwood (*Olneya tesota*). Variation in dominance between these species was observed depending on the size and location of the wash. Smaller washes on the upper bajadas tended to have only palo verde trees, while washes and drainages in the steep mountains often lacked trees. Shrub and subshrub species common in the washes and drainages included desert-lavender (*Hyptis emoryii*), sweet bush, cheese-bush, jimson weed (*Datura metaloides*), catclaw, and rush milkweed (*Ascelpias subulata*).

Drainages and washes near the foothills of the steep mountains and in the mountains surrounding the proposed Eagle Mountain landfill site have very few individuals of trees, most of these being palo verde trees. These drainages and small washes are dominated by the desert-lavender bush. A common subshrub in these mountain drainages is arrow leaf (*Pleurocoronis pluriseta*) along with rose mallow (*Hibiscus denudatus*) and sweet bush.

Alkaline drainages and washes south of the Coachella Canal are often vegetated with tamarisk scrub dominated by tamarisk trees (*Tamarix* sp.) and arrowweed scrub dominated by shrubs of arrowweed (*Pluchea sericea*). Wet drainages just south of the Coachella Canal have localized areas of cattail (*Typha* sp.) and iris-leaved rush (*Juncus xiphioides*). A few fan palms (*Washingtonia* sp.) have been introduced into these drainages.

Wetland vegetation in alkaline sink areas consists of low-growing perennial plants adapted to tolerate high alkalinities and salt concentrations. The drier margins of these areas are vegetated predominantly with salt grass (*Distichlis spicata*) and various saltbushes (*Atriplex* spp.), while the wetter areas in the lower portions of the sink are either dominated by iodine bush (*Allenrolfea occidentalis*) and Torrey sea-blite (*Suaeda torreyana*) or completely devoid of any vegetation. The bare areas of the sink had a salt crust on the surface of the soil at the time of the survey.

Desert saltbush scrub communities within the chenopod scrub are dominated by a variety of saltbush species that include shad scale, wheelscale (*Atriplex elegans*), desert-holly (*Atriplex hymenelytra*), and allscale (*Atriplex polycarpa*). The desert sink scrub community of the chenopod scrub is dominated by iodine bush and Torrey sea-blite along with scattered individuals of various saltbushes. This community type occurs in areas of poorly drained soils with high salinity and alkalinity where a salt crust often forms on the surface of the ground. Inclusions of desert greasewood scrub and alkali-seep areas are found within the desert sink scrub community. Desert greasewood scrub is similar in species composition to the desert sink scrub; however, the densities and overall diversity of species is much lower. Alkali-seep areas are dominated by salt grass and other salt-tolerant herbs where soils are permanently moist.

c. Wildlife

A wide diversity of wildlife species are supported by habitat that ranges from steep, rough terrain to gently sloping bajadas. In the area surrounding the proposed Eagle Mountain landfill site, steeper rocky areas are relatively undisturbed. Overall, the area is generally high-quality Colorado Desert creosote bush scrub habitat for a wide variety of large, far-ranging species as well as smaller, more restricted species.

Wetland and alkaline sink habitats south of the Coachella Canal supported most of the same wildlife species found to the north. Evidence of small mammals was sparse, but the amount of cover probably helped to support the same number and species of birds seen throughout the project. Large mammals including coyote and mule deer were also present in these areas. Mesic areas support even more species than the other drier desert areas. For example, waterfowl and wetland-associated mammals were observed while surveying the tributary of Salt Creek.

On the proposed Eagle Mountain Mine landfill site (including private and public selected lands), 4 species of reptiles, 8 mammals, and 21 bird species were observed. Reptiles most commonly observed were side-blotched lizard (*Uta stansburiana*) and long-tailed brush lizard (*Urosaurus graciosus*). Commonly observed or detected mammals were Nelson's bighorn sheep, black-tailed hare (*Lepus californicus*), and coyote (*Canis latrans*). Common birds in the undisturbed portions of the proposed landfill site include rock wren (*Salpinctes obsoletus obsoletus*), verdin (*Auriparus flaveceps acaciarum*), black-throated sparrow (*Aimophila bilineata deserticola*), and white-crowned sparrow (*Zonotrichia leucophrys*). These birds are common inhabitants of desert regions of southern California. The disturbed portions of the Eagle Mountain site supported fewer wildlife species than the natural areas. Species observed included house finch (*Carpodacus mexicanus frontalis*) and the introduced house sparrow (*Passer domesticus*).

Habitat along the proposed Eagle Mountain Road Extension is similar to habitat found on the flatter portions of the proposed landfill site, and species diversity observed did not differ significantly. The Eagle Mountain rail line traverses several microhabitats, as well as creosote bush scrub, which resulted in the observation of additional wildlife species, and the Kaiser Steel Resources properties along the railroad right-of-way being offered to BLM as part of the project's land exchange also contain varied habitats. A total of 7 reptile, 10 mammals, and 29 bird species were observed. Species commonly seen included western whiptail (*Cnemidophorus tigris*), side-blotched lizard, black-tailed hare, desert woodrat (*Neotoma lepida*), kangaroo rat (*Dipodomys* spp.), Gambel's quail (*Callipepla gambelii*), verdin, rock wren, ruby-crowned kinglet (*Regulus calendula*), and black-throated sparrow. Habitat in washes generally supports the same species, but at increased densities. Wetland habitat within the railroad corridor is too small to support many vertebrate species. The Coachella Canal supports a few nonnative fish species.

2. Biological Resources of Special Concern

a. Habitat Areas

BLM Habitat Management Areas (HMAs) occur in the vicinity of the proposed project and include desert tortoise habitat in the Chuckwalla Bench and Chuckwalla Valley and three Nelson's bighorn sheep management areas. Two BLM Areas of Critical Environmental Concern are also in the vicinity of the proposed project boundary south of Interstate 10. The Eagle Mountain rail line right-of- way passes through the western extent of the Chuckwalla Bench ACEC, which has been established primarily for protection of the desert tortoise, and the Salt Creek ACEC near Ferrum Junction, which has been set aside to protect the desert pupfish and Yuma clapper rail.

Major washes and drainages are considered sensitive habitat areas by CDFG. One major intermittent wash, Eagle Creek, occurs on the proposed landfill site. The Eagle Mountain rail line crosses two permanent watercourses: a tributary of Salt Creek and the Coachella Canal. The railroad right-of-way also crosses approximately 118 washes which flow under the rail line by a system of berms and culverts. Eagle Mountain Road crosses 18 washes. No culvert or berming system was developed for the Kaiser Truck Trail north of the aqueduct pumping station, and it is currently washed out in two places.

b. Wildlife Species of Special Concern Observed

Figure 60a shows the significant wildlife sightings and water sources at the proposed Eagle Mountain landfill property (both private and public selected lands), and Figure 60b shows the significant plant species at the site. Figures 61a and 61b show the sensitive biological resources along Eagle Mountain Road, its proposed extension, and the spur to the Phase II container handling yard. Figures 62a through 62e show the sensitive biological resources along the Eagle Mountain rail line right-of-way and on the Kaiser Steel Resources properties to be offered in the land exchange. Eleven wildlife species of concern were observed or detected by sign in the Eagle Mountain landfill project area or along the associated roads and railroad right-of-way, including desert tortoise, Nelson's bighorn sheep, California leaf-nosed bat, Townsend's big-eared bat, ringtail, American badger, northern harrier, LeConte's thrasher, yellow warbler, yellow-breasted chat, and black-tailed gnatcatcher. A total of 29 wildlife species of concern have the potential to occur in the project area. A short description of the species observed follows.

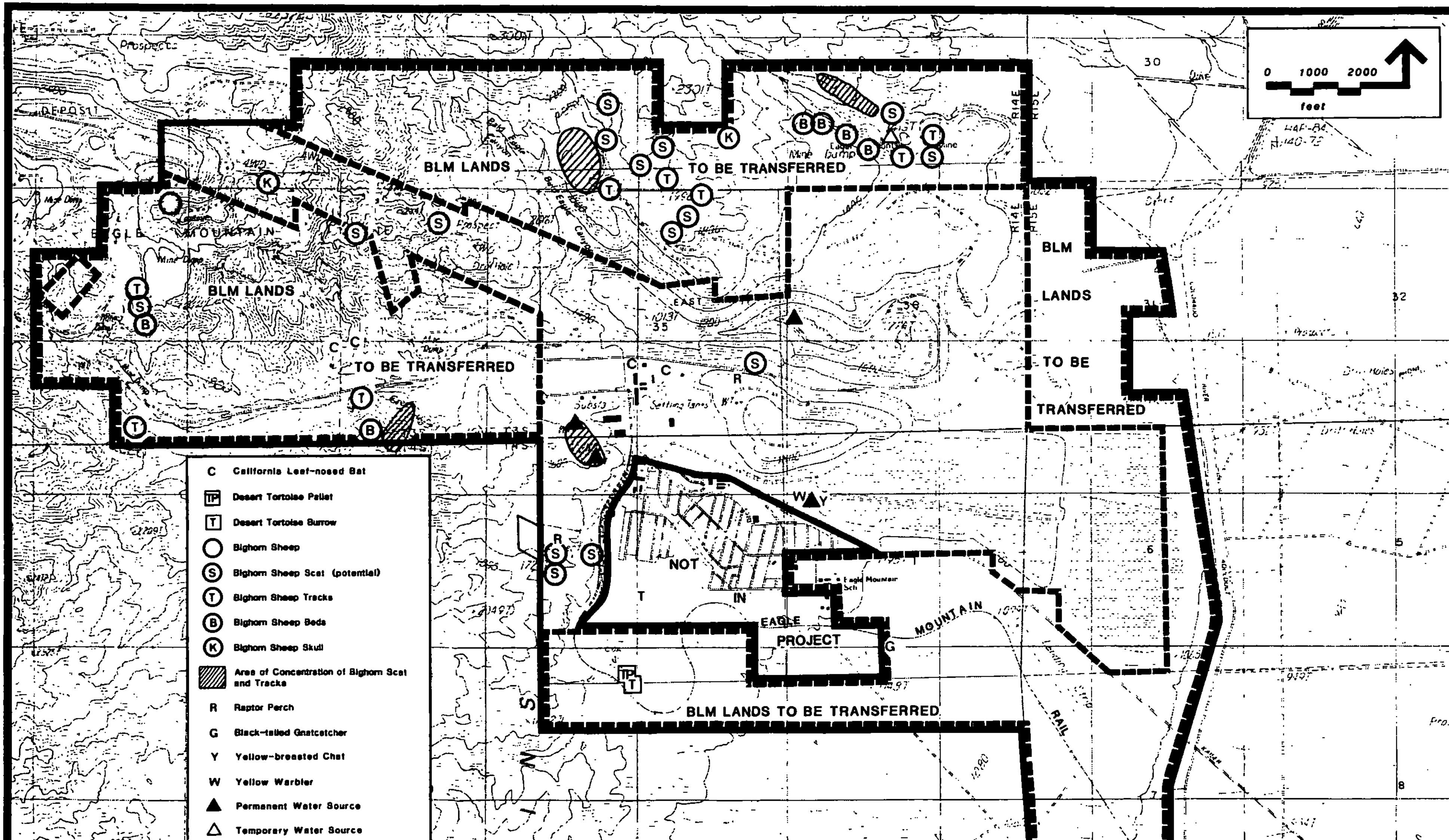


FIGURE 60a. SIGHTINGS OF WILDLIFE SPECIES OF SPECIAL CONCERN AND WATER SOURCES AT THE PROPOSED EAGLE MOUNTAIN LANDFILL SITE

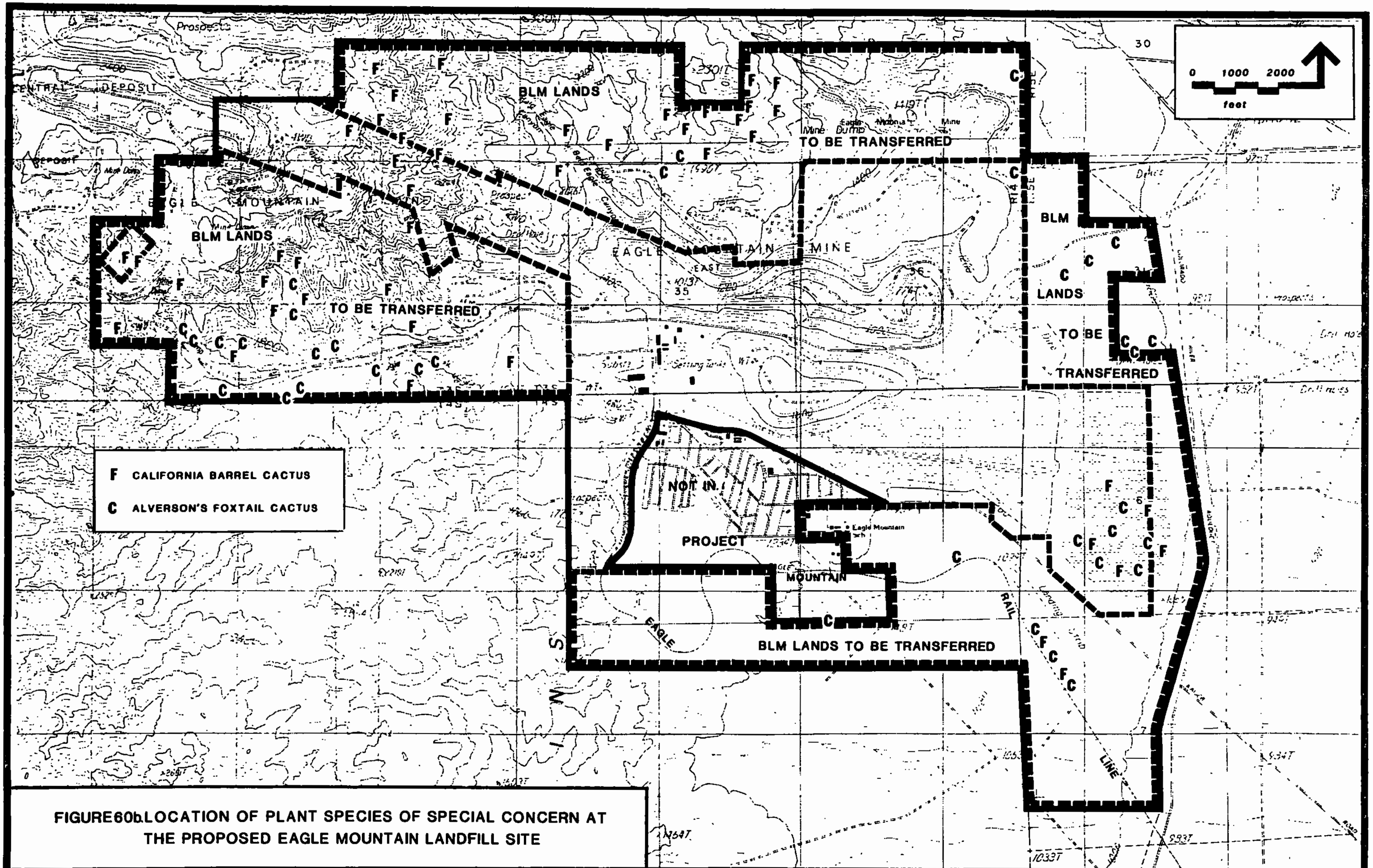


FIGURE 60b. LOCATION OF PLANT SPECIES OF SPECIAL CONCERN AT THE PROPOSED EAGLE MOUNTAIN LANDFILL SITE

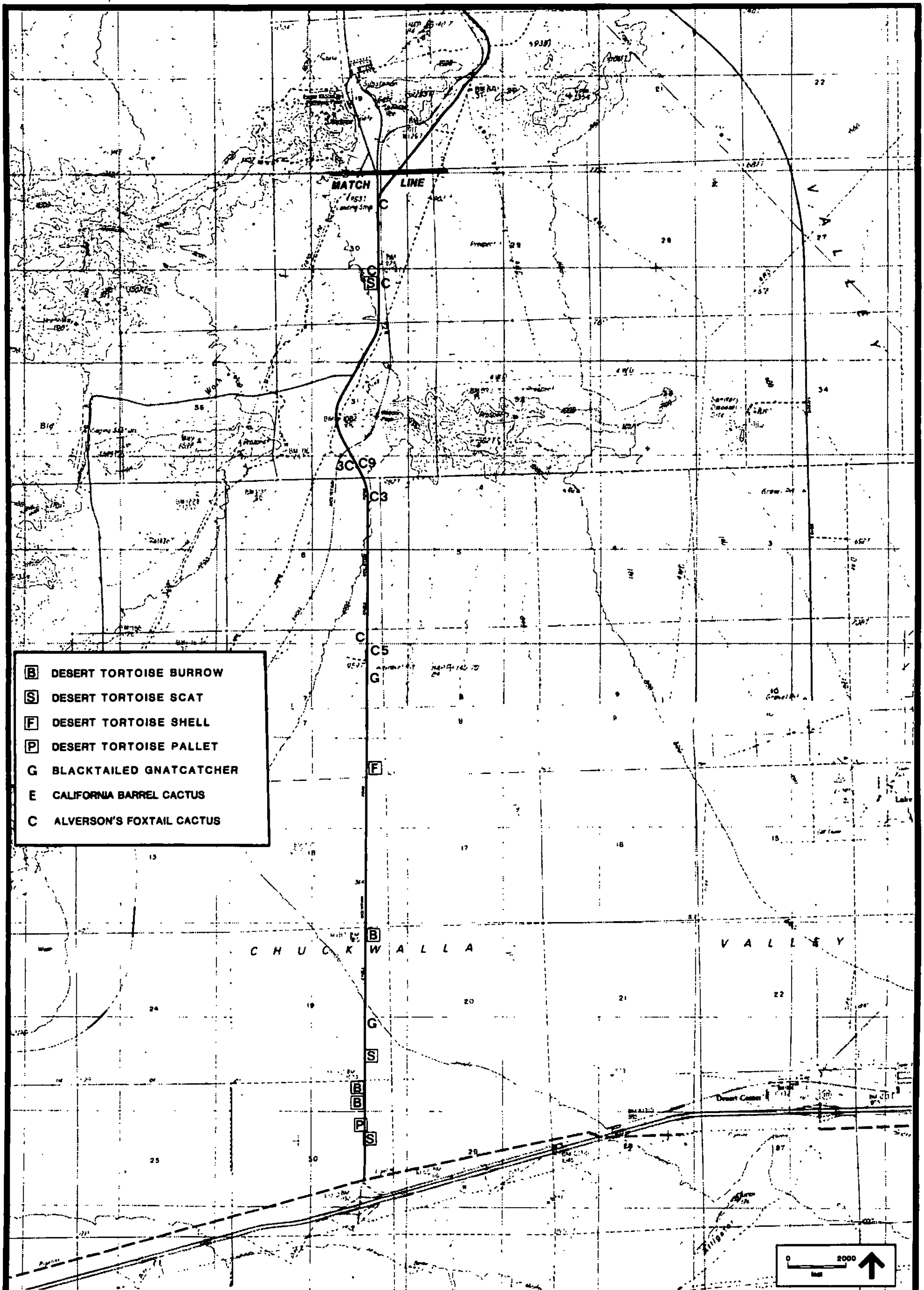


FIGURE 61a. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN ROAD AND SPUR LOCATION MAP 1 OF 2

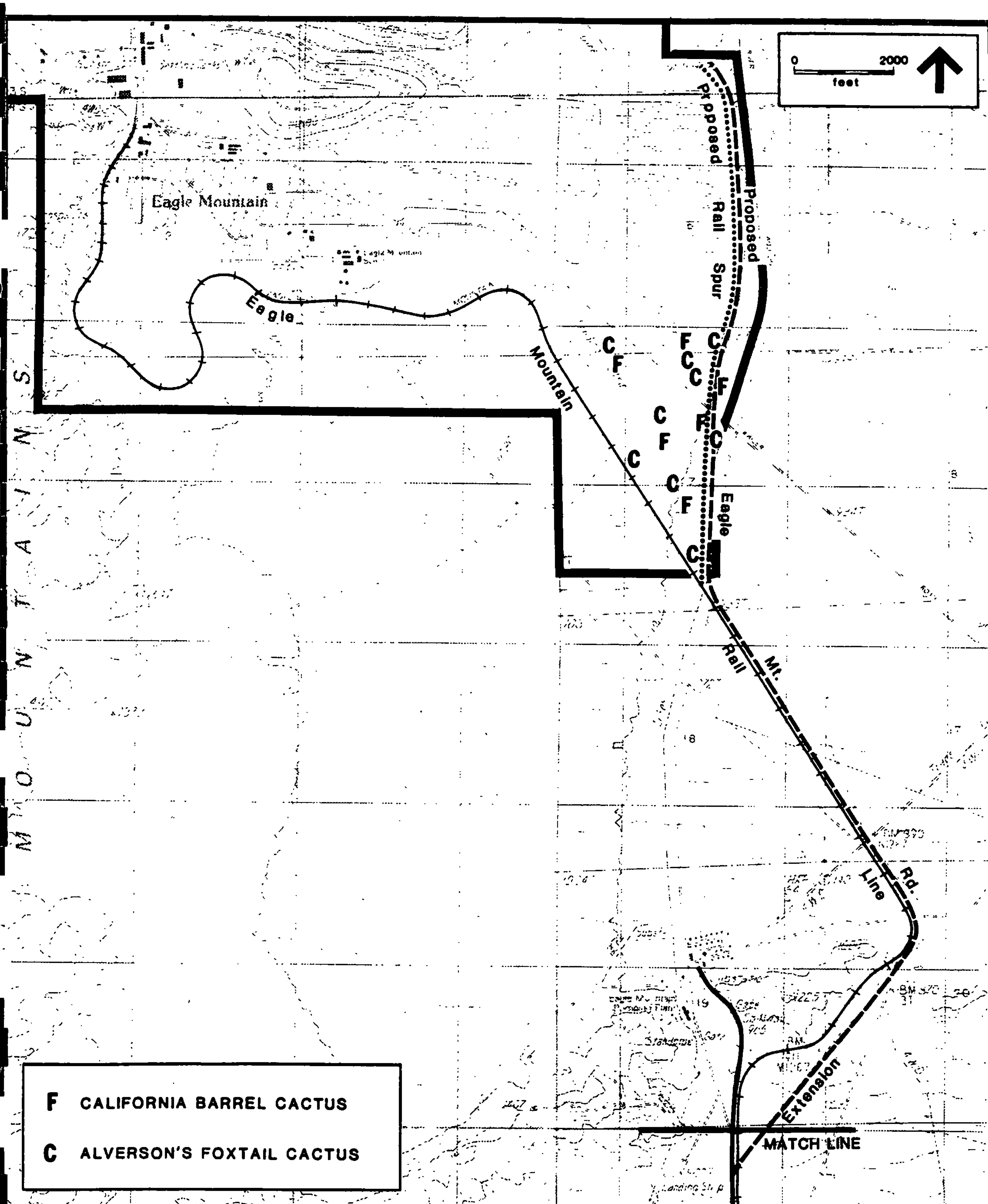


FIGURE 61b. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN ROAD EXTENSION AND RAILROAD SPUR
MAP 2 OF 2

RECON

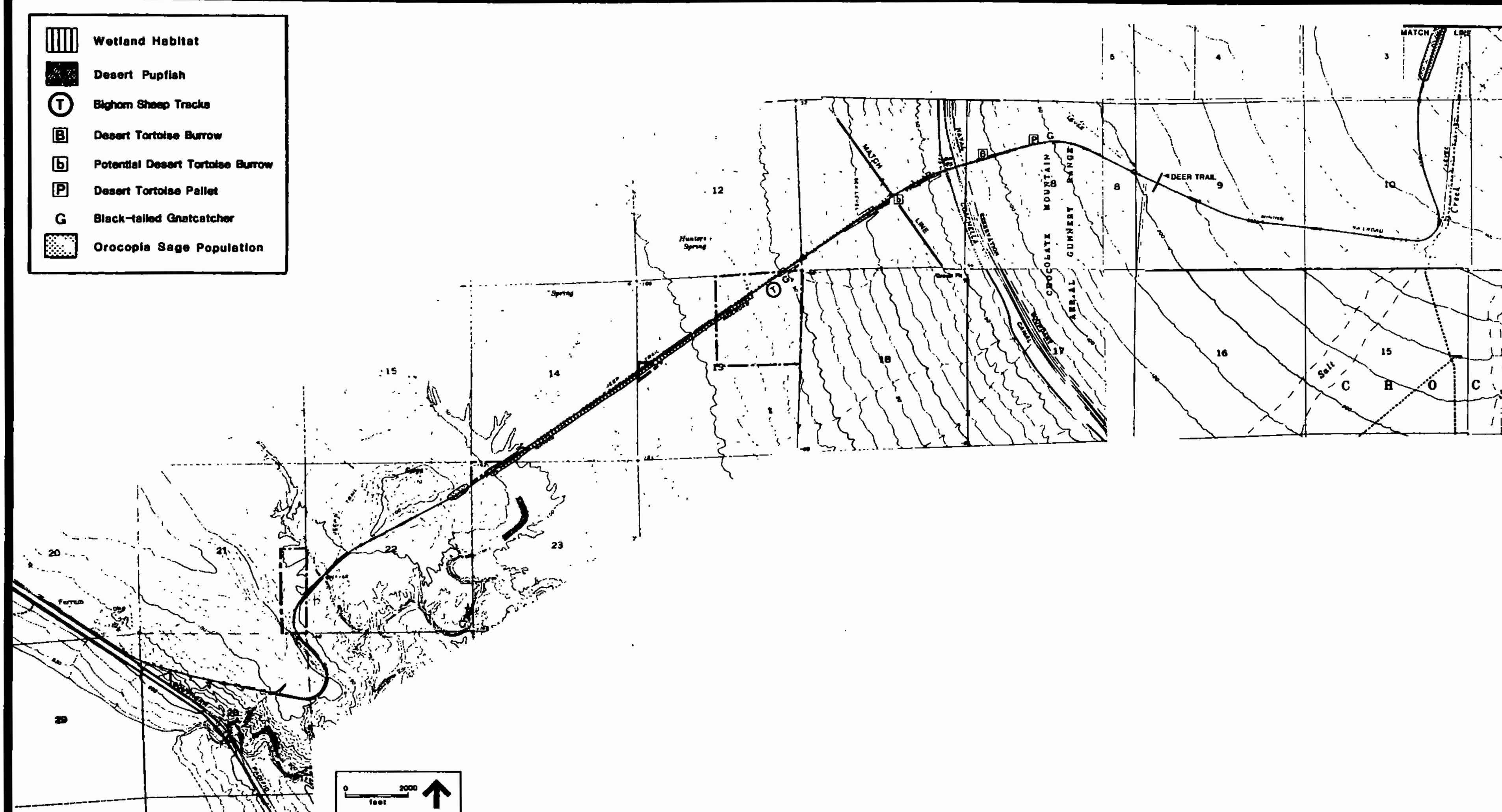


FIGURE 62a. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 1 OF 5

RECON

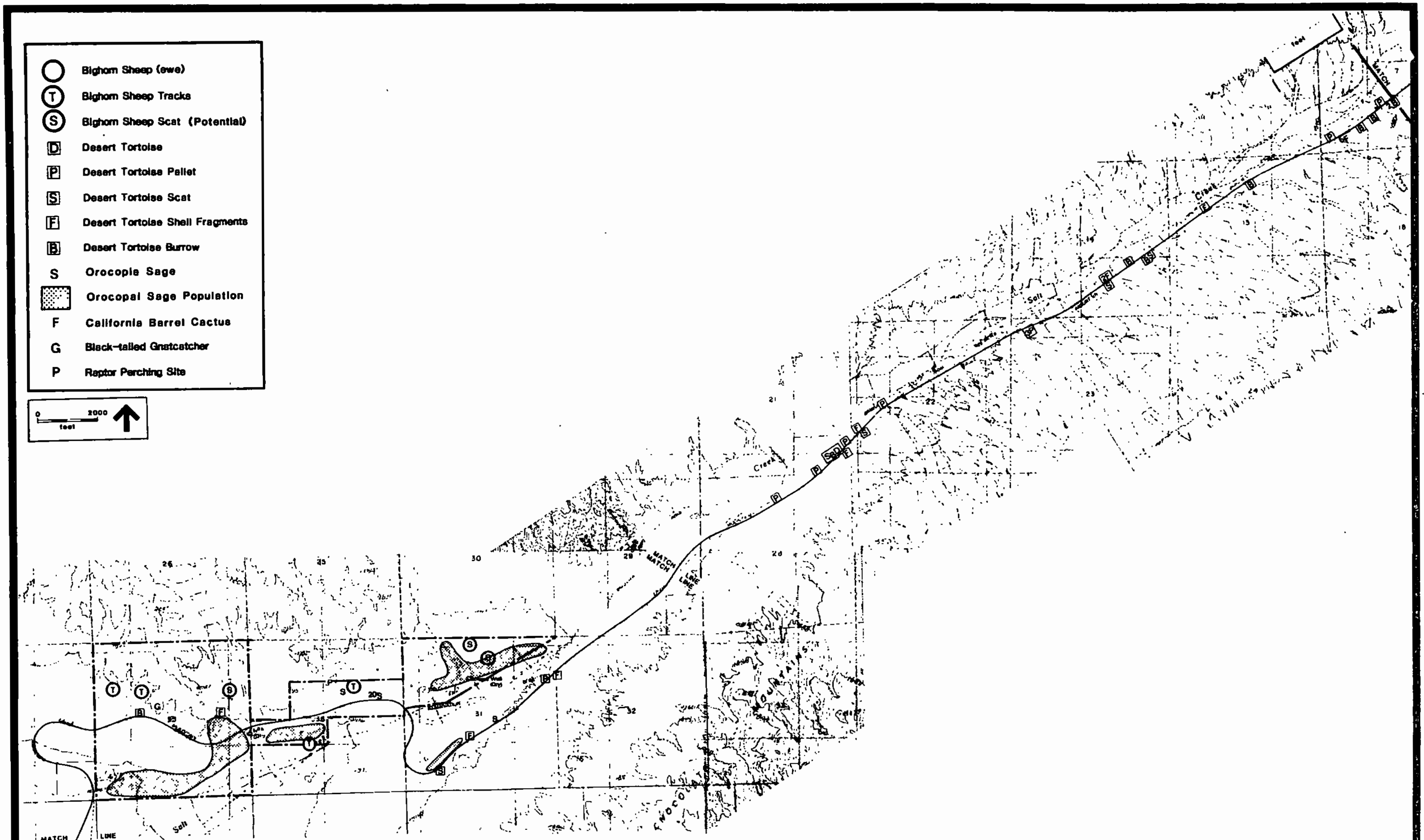


FIGURE 62b. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 2 OF 5

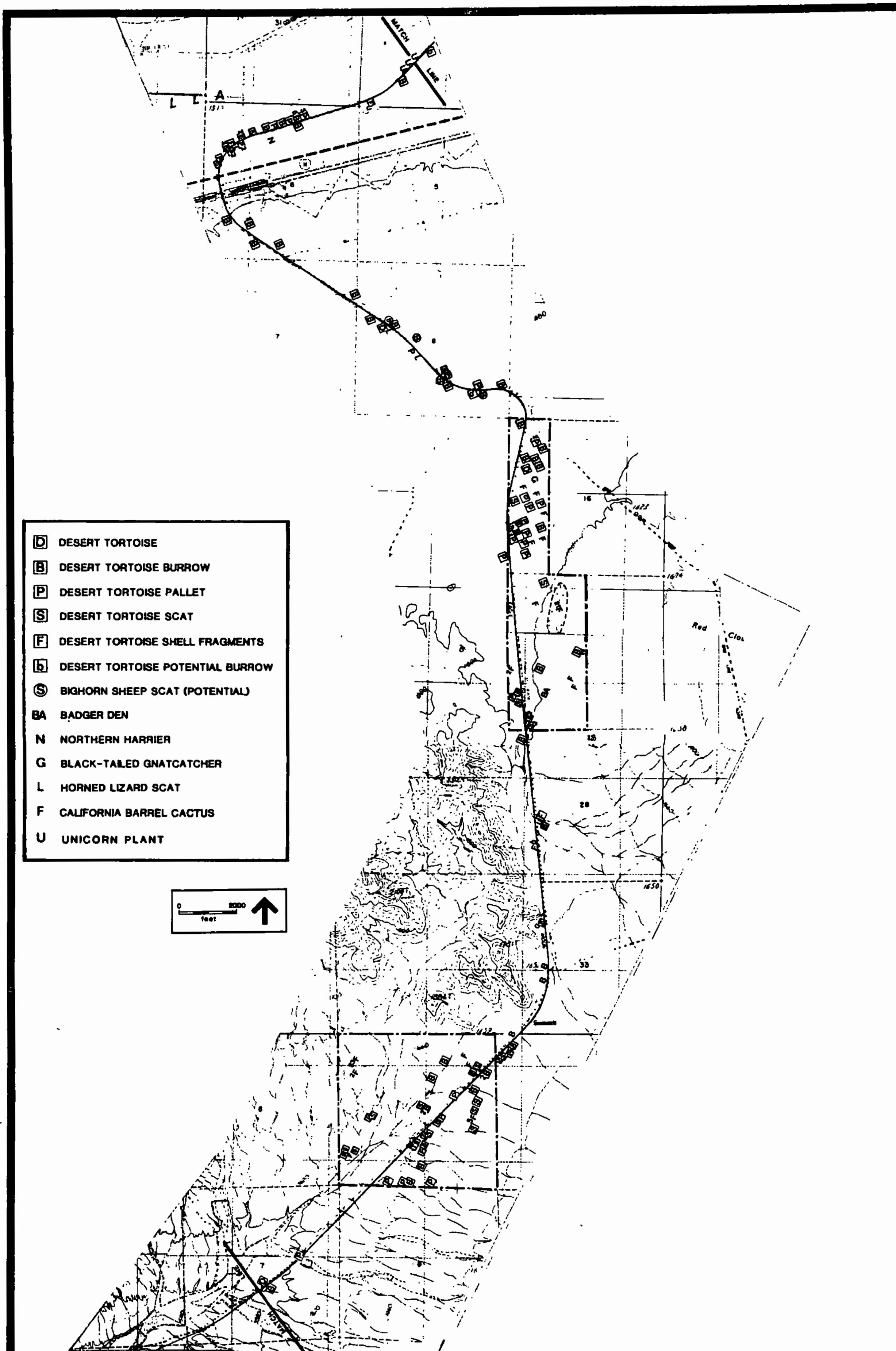


FIGURE 62c. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 3 OF 5

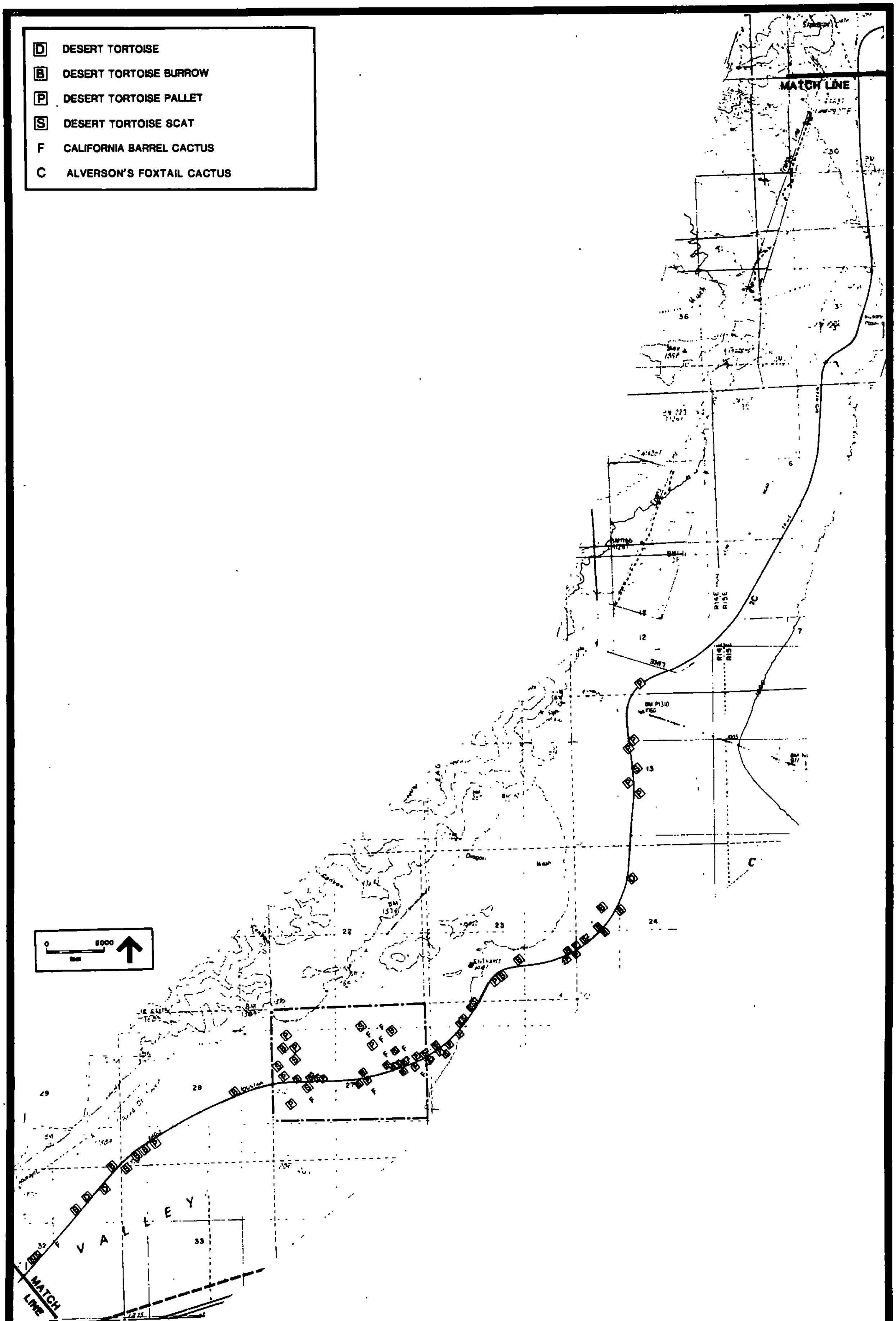


FIGURE 62d. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 4 OF 5

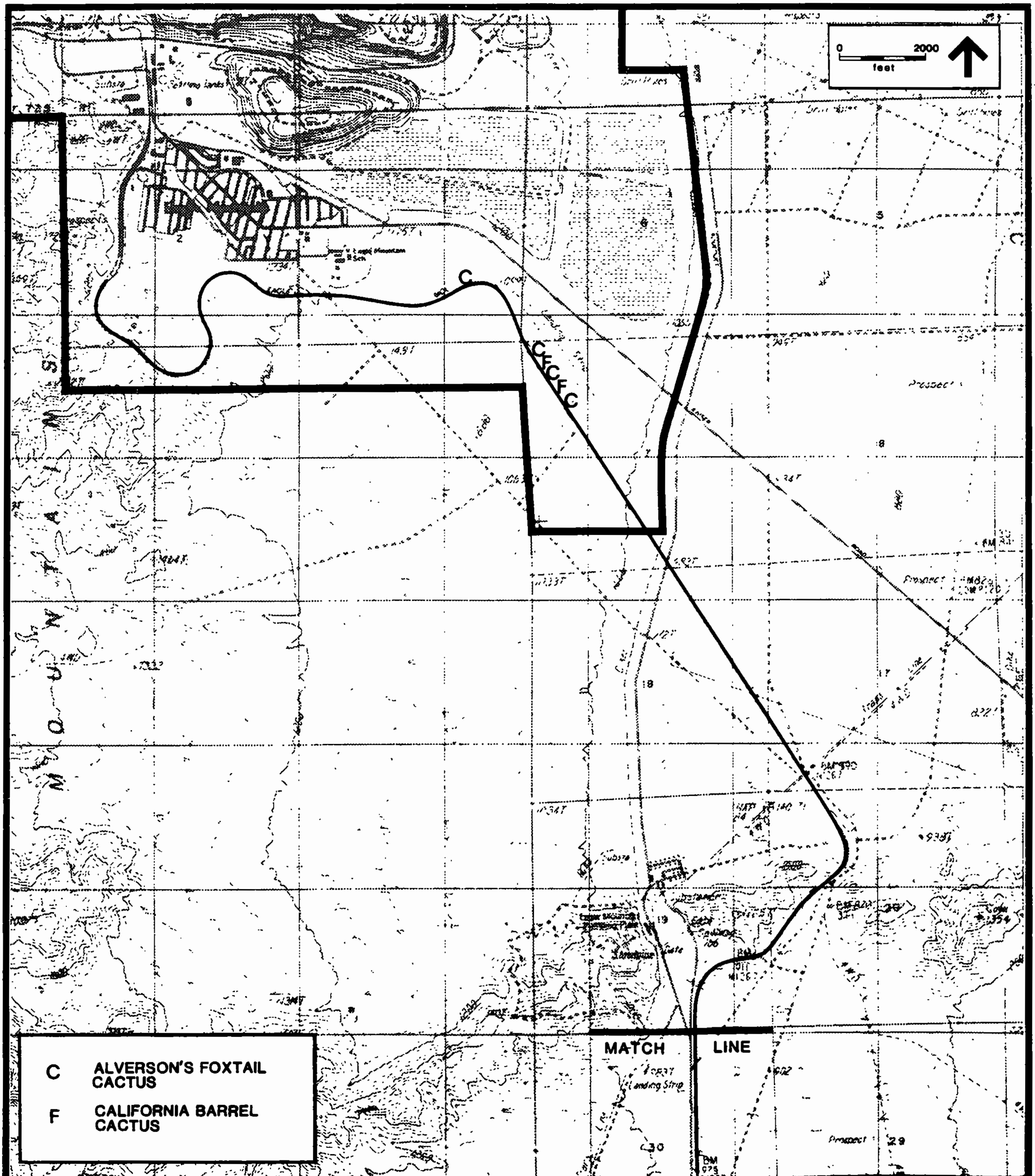


FIGURE 62e. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN RAIL LINE AND KAISER PROPERTIES, MAP 5 OF 5

RECON

Desert Tortoise

The desert tortoise is a federal and State of California threatened species. It ranges from southern Nevada and extreme southwestern Utah through southeastern California and southwestern Arizona into northern Mexico (State of California 1989). In California, the tortoise occurs in northeastern Los Angeles, eastern Kern and southeastern Inyo counties, and most of San Bernardino, Riverside, and Imperial counties. Based upon genetic studies, two major genetic subpopulations have been identified (Jennings 1985; Spang et al. 1988). The dividing line between these subpopulations is the Colorado River. The tortoises east of the Colorado River are referred to as the Sonoran population. Those tortoises west of the Colorado River, including those on the project site, are designated as the Mojave population.

The desert tortoise is considered to be a "K-selected" species, meaning that it has a low birth rate, low recruitment of juveniles into the breeding population, low mortality in older age categories, and a low population turnover rate (Hohman et al. 1980). As a result, the number of adults may remain constant for relatively long periods, during which the ratio of adults to other age groups may vary widely. Next to the number of breeding adults, the number of juveniles likely to join the ranks of adults is a critical component of a stable population. However, assessing the number of juveniles in a population is very difficult, and an optimum value for the adult/juvenile ratio is not currently known.

Tortoises are active only during the warmer months of the year, with greatest activity in the spring. Their active season begins in early March and ends in late October or early November. They remain inactive in their burrows during the winter months. Tortoises are also relatively inactive during the peak of summer, when ambient temperatures are highest. There is evidence that the daily activity pattern of this species is dictated by air temperature. Tortoises are active primarily between ambient temperatures of 65 to 105 degrees Fahrenheit (18 to 42 degrees Celsius) (Karl n.d.), often resulting in a bimodal daily activity pattern, early morning and late afternoon. Rainfall also can stimulate tortoise activity, as they will emerge from their burrows to drink rainwater, even if ambient temperatures are not optimal (Nagy and Medica 1986).

The preferred diet of the desert tortoise consists primarily of ephemeral forbs and grasses and perennial grasses (Burge and Bradley 1976; Hansen et al. 1976; Coombs 1979; Nagy and Medica 1986).

Courtship and mating typically occur in the spring, but not all adult tortoises within a population reproduce during a particular year. Nests are dug by the female tortoise, and anywhere from 2 to 14 eggs are deposited (Ernst and Barbour 1972; Turner et al. 1986). Incubation time ranges from 98 to 135 days (Hohman et al. 1980). A breeding female may lay from one to three clutches in a summer (Turner et al. 1984, 1986).

Based upon data for desert tortoises in California, Arizona, Nevada, and Utah, the average home range of a tortoise is estimated to be between 27 and 131 acres (11 to 53 hectares) (Berry et al. 1986). Females typically have smaller home ranges than males. Long-term movement patterns for individual tortoises and whole populations are not well understood. It is not known how far an individual tortoise travels over the course of its lifetime and in what patterns. It is also not known which individuals and groups are likely to migrate to other habitat areas, how long such movements take, and what conditions prompt or prohibit such movement (RECON 1990).

The small amount of desert tortoise sign found near the proposed Eagle Mountain landfill site was in a flat area south of the Eagle Mountain townsite on a parcel of public (selected) lands and outside of the project boundary. Any potential impacts to desert tortoise in this area from townsite development will be dealt with in the environmental documents to be prepared for the specific plan area of the Eagle Mountain townsite. No impacts to desert tortoise are expected at the landfill site from the proposed project.

The Eagle Mountain rail line right-of-way and the Kaiser-offered lands fall within the BLM California Desert Conservation Area, and portions of the railroad and offered lands fall within Category 1 and 3 designated desert tortoise habitat. Category 1 habitat areas are those which are the most important for desert tortoise management consideration and Category 3 is the least. Portions of the CDCA have been surveyed by BLM for tortoise densities. Tortoise densities of 100 to 250 animals per square mile have been reported in habitat along the Eagle Mountain rail line just south of Interstate 10. Lower tortoise densities of 20 to 50 animals per square mile have been documented adjacent to the high-density habitat along the Eagle Mountain rail line right-of-way north and south of the interstate.

Nelson's Bighorn Sheep

Nelson's bighorn sheep is a State of California fully protected species and a BLM sensitive species. Results of an aerial survey of the Eagle Mountains conducted by CDFG (U.S. Department of the Interior 1986) showed approximately 50 bighorn sheep residing in the Eagle Mountains. A second aerial survey conducted by the National Park Service and BLM, on September 24, 1990, confirmed that approximately 50 sheep inhabit the Eagle Mountains, with 19 individuals observed in the vicinity of the Eagle Mountain Mine. Populations of bighorn sheep also occur in the Orocopia (50), Chuckwalla (35-40), and Chocolate mountains (100). Habitat management plans have been developed for bighorn sheep in the Orocopia and Chuckwalla mountain ranges, and a habitat management plan is planned for the Eagle Mountains. Potential corridors for bighorn sheep movement occur between foraging ranges and across the railroad corridor.

Bighorn sheep sign were observed on roads, ravines, and ridgetops within the Eagle Mountain landfill site (see Figure 60a). One potential bedding area was observed in the northeast portion of the site. Bighorn sheep have become somewhat habituated to mining operations. Local residents regularly observe up to 20 sheep drinking from the leaky water tank west of the Eagle Mountain townsite (Anderson, Kaiser Steel Resources, 1989). Although sheep may continue to use a disturbed area, the level of stress they endure, which could affect their susceptibility to disease or decreased reproductive success, is not known. Three permanent and one temporary water sources on the Eagle Mountain landfill site showed bighorn sheep sign along their edges. One bighorn sheep was observed within the railroad corridor. Probable bighorn sheep tracks were observed in the railroad corridor south of Interstate 10 as far south as the Coachella Canal and in the parcels owned by Kaiser Steel Resources to be offered to BLM in Salt Creek (see Figures 62a and 62b).

Bighorn sheep move between mountain ranges. Although the reasons for this intermountain movement are unknown, BLM has documented established movement corridors for sheep in the California desert area. A summary of intermountain movements by bighorn sheep (Schwartz, Bleich, and Holl 1986) and observations during sheep translocation programs indicate that bighorn sheep can travel long distances. Schwartz, Bleich, and Holl (1986) suggest that because of these movements, bighorn sheep may consist of metapopulations with a subpopulation occurring in each mountain range. Movement increases the potential for genetic variability within the metapopulation. These researchers further conclude that the subpopulations vary in number and genetic structure as habitat changes within a mountain range, creating a variable population structure through time.

Desert Pupfish

The Salt Creek tributary drainage that is crossed by the Eagle Mountain rail line approximately two and one-half miles upstream from the Salton Sea is desert pupfish habitat (NW1/4 Sec. 23, T. 8 S., R. 11 E.). The desert pupfish is a federal and state endangered species. A survey conducted by CDFG in 1986 found a population of 70 pupfish in the tributary of Salt Creek approximately one-quarter mile downstream of the Eagle Mountain rail line trestle, at the confluence of this tributary with the main drainage of Salt Creek. Results of that survey indicate that good pupfish habitat extends along the streambed from the railroad trestle to the confluence with Salt Creek and further downstream approximately one-half mile to where a power line crosses the creek. Some areas of this habitat, however, were too shallow to set traps.

Surveys conducted by CDFG in early June, 1990, found 125 pupfish in the same area of the tributary to Salt Creek; however, a flash flood reduced the pupfish population to two fish on June 16. Pupfish have also been observed in the BLM property at Rancho Dos Palmas, at the head of the tributary drainage discussed above, approximately two miles upstream from the railroad trestle. Surveys conducted in May and June, 1990, found no pupfish in an alkali pond within the railroad right-of-way east of the Salt Creek tributary. Habitat directly beneath the trestle and within the survey boundaries up- and downstream of the trestle appears appropriate for desert pupfish.

Bats

The California leaf-nosed bat and Townsend's big-eared bat were observed during directed surveys of the site (see Figure 60a). These species are California Species of Special Concern, with the leaf-nosed bat a Category 2 candidate species for listing by the U.S. Fish and Wildlife Service (USFWS). A diurnal roosting site for California leaf-nosed bats was found in the mine tunnel (adit) west of the East Pit. Pregnant female bats were captured in the night roosts, indicating that the diurnal roosting site may also be a maternity roost. Night roosts for this species were found in three additional sites. This species was found, during the November–December 1990 survey, to use the adit as a winter roosting site. This is the only known winter roost for this species in the Eagle Mountains, and 100-200 individuals were estimated to be present at the time of the survey (Brown 1990).

Sign of the Townsend's big-eared bat was also found in the adit. The bat droppings observed near the entrance to the adit were in a typical formation signifying evidence of a maternity roost (see Attachment 1 in Appendix F). However, the droppings were at least one year old and no individuals were observed during either survey.

Other Mammals

One American badger burrow was observed along the railroad right-of-way south of Interstate 10. Ringtail tracks were observed in the adit on the mine site. Ringtails are naturally scarce in the desert but are always found near water sources within their home range. Both these species are California Species of Special Concern and the ringtail is fully protected by the State of California.

Birds

Sensitive bird species observed were black-tailed gnatcatcher, LeConte's thrasher, yellow warbler, yellow-breasted chat, and northern harrier. These birds are California Species of Special Concern. Black-tailed gnatcatchers were found in most washes that had relatively dense native tree species in habitat along the railroad, Eagle Mountain Road, and in the Eagle Mountain landfill site. The yellow warbler and yellow-breasted chat were observed during the migration season in the Eagle Mountain townsite. One northern harrier was observed foraging north of Interstate 10.

c. Wildlife Species of Special Concern Potentially Occurring

Several sensitive wildlife species not observed during the surveys may use the habitats within the project boundaries and the Kaiser Steel Resources properties. Those species that are on federal or state threatened or endangered lists are discussed below.

The peregrine falcon is a federal and state listed endangered species. These birds are generally found along the coast where they frequent coastal estuaries and areas which concentrate migrant waterfowl and shorebirds upon which peregrines prey. Peregrines observed inland during migration or the winter are usually found at areas with water and they have been observed wintering in the regional area (i.e., the Colorado River). They do not nest in southern California deserts.

Swainson's hawk is a California threatened species and a federal Category 2 species for listing. The Swainson's hawk is observed occasionally in the desert during spring and fall migrations and may hunt over the project site during that time, but the hawk has not been documented as a breeder in the vicinity of the project site. Tall cottonwood or sycamore trees are Swainson's hawks' preferred nesting sites, and no tall trees occur within the project boundaries.

The golden eagle is a California fully protected species and a BLM sensitive species. It is also protected by the federal Bald Eagle Protection Act. BLM (1980) has identified three areas of potential foraging habitat near the vicinity of the project site. Golden eagles were not observed in the project area during the survey; however, potential perching and roosting sites were observed in undisturbed and disturbed habitat in the Eagle Mountain landfill site. No appropriate nesting habitat was observed on the site. Potential foraging habitat was observed on the flatter portions of the mine project and in ravines and washes of the Eagle Mountains.

Yuma clapper rail is a federally endangered species and a California threatened species. Surveys conducted by the Bureau of Reclamation in 1988 (1989) revealed approximately eight Yuma clapper rails in March and six in April in the Salt Creek marsh area in the Dos Palmas Ranch (part of the Salt Creek ACEC). No clapper rails were observed during this survey within 100 feet of the railroad bed and no clapper rails are expected to occur along the railroad corridor because no appropriate habitat exists.

California black rail is a California threatened species and a Category 1 candidate for federal listing. A recent survey reported black rails in the Salt Creek tributary area west of the railroad and in similar habitat as the Yuma clapper rail (Bureau of Reclamation 1989). No rails were observed during the survey and no appropriate habitat occurs along the railroad corridor.

Eagle Mountain scrub jay (*Aphelocoma coerulescens cana*) is a subspecies of scrub jay only known to occur in the pinyon/juniper woodland habitat on the upper elevations of Eagle Mountain, in Joshua Tree National Monument (Peterson 1990). This bird is believed to have originated by hybridization between coastal and interior jay populations (Peterson 1990). The population is estimated at only 40-50 birds confined primarily to 150 acres of pinyon/juniper woodland near the peak of Eagle Mountain (Peterson 1990; Hays, pers. comm. 1991). This subspecies has been proposed by the USFWS as a Category 2 species. The status of this bird is likely to change as more information is collected. Eagle Mountain is located approximately

18 miles from the landfill site. No scrub jays were observed on the project site during any of the biological surveys.

d. Sensitive Plant Species

No listed state or federal plant species were observed within the bounds of the project, and none are expected to occur in the area. Several sensitive plant species which are candidates for federal listing or considered rare and endangered by the California Native Plant Society were observed at the landfill site and along the railroad right-of-way.

One federal Category 2 candidate species and one federal Category 3c species were observed within the project boundaries of the proposed Eagle Mountain landfill area: Alverson's foxtail cactus (*Coryphantha vivipara* var. *alversonii*) and California barrel cactus (*Ferocactus acanthodes* var. *acanthodes*), respectively. Alverson's foxtail cactus were observed frequently in areas of the existing Eagle Mountain Mine. Three large populations were found in the southwest portion of the mine along Eagle Creek, in the washes to the north of the mining road, and in the southeast portion of the mine from near the landing strip to north of Kaiser Road and west of Eagle Mountain Road (see Figure 60b). A large population of California barrel cactus occurs on the undisturbed slopes adjacent to the mine and in the tailing pond in the southeastern portion of the mine.

Two federal Category 2 candidate species and one federal Category 3c species were observed within the corridor of the railroad right-of-way: Alverson's foxtail cactus, Orocopia sage (*Salvia greatea*), and California barrel cactus, respectively. Unicorn-plant (*Proboscidea althaeifolia*) and crucifixion thorn (*Castela emoryi*), both listed as sensitive plants by the California Native Plant Society, were observed within the railroad corridor (see Figures 62a-62e).

A few plant species (e.g., California ditaxis, California snake-bush) occurring historically in the area of the Eagle Mountains have the potential for occurrence within the project area, but they were not observed within the study corridors during the surveys of the site. They are discussed in the biology technical report for the project (see Appendix F).

H. Growth Inducement and Socioeconomics

The affected environment from a growth inducement and socioeconomic standpoint includes Eagle Mountain and the nearby communities of Desert Center and Lake Tamarisk, which are located southeast of the project site. The Lake Tamarisk development consists of privately owned single-family homes, a mobile home park, two recreational lakes, and a golf course. Desert Center has 13 single-family residences and several highway-related businesses. Commercial services in the area are found primarily in Desert Center.

Little demographic and economic information is available for these communities in the Chuckwalla census tract. Since the mining operations have ceased, the 1980 census information is no longer valid. The population in Eagle Mountain is reduced substantially from the 1980 estimates. However, a 1989 census tract update by the Riverside County Planning Department and field visits to the area do provide information on the existing community conditions at Eagle Mountain, Lake Tamarisk, and Desert Center. Information from the 1990 census is not yet available (Archibeque, Riverside County Planning Department, 3/11/91). The estimated population for the larger subregion is approximately 400. This larger area would include persons living along Rice Road to the north and at the Metropolitan Water District Eagle Mountain Pumping Plant.

1. Growth Inducement

a. Eagle Mountain

The town of Eagle Mountain has changed significantly since the Kaiser mine closed in 1982. In 1978 there were 3,700 persons living at Eagle Mountain, 416 permanent residences, 185 trailers, 450 dormitory rooms, and supporting commercial facilities (Kaiser Steel Corporation 1978:6). As late as 1980, census data indicated that there were 579 dwelling units and a population of 1,859 at Eagle Mountain. While the infrastructure is still in place to support a larger population, the town of Eagle Mountain now supports only the Kaiser office facilities and the return-to-custody facility for parole violators. The RTCF has been operating in Eagle Mountain since 1986 under a lease from Kaiser Steel Resources and a County Public Use Permit. The facility presently houses 271 inmates; a maximum of 500 inmates is allowed.

Eagle Mountain presently has a population of 174, housed in 60 dwelling units. These units are currently occupied by Kaiser employees or rented by Kaiser to others (e.g., employees of the RTCF or individuals). Kaiser Steel Resources owns all of the housing units in Eagle Mountain. As noted previously, the community contained 1,859 people in 1980 which were housed in 579 dwelling units. Consequently, over 400 vacant dwelling units currently exist at Eagle Mountain. Supporting commercial and institutional uses (post office, laundromat, pharmacy, bowling alley, store and cafe, bank, medical and dental offices, and two churches) are no longer operating.

The only ongoing uses at Eagle Mountain include the Kaiser Steel Resources management office, the RTCF, and the high school which is being used for grades K-8 (approximately 90 students). A trailer park is planned by Kaiser Steel Resources for Eagle Mountain to provide rental recreational vehicle trailer spaces (Stokes, Kaiser Steel Resources, 3/1/91). Any resource production uses since the mine closure have been limited to sporadic shipments of previously stockpiled pelletized iron concentrates and rock products such as riprap, road base, and decorative crushed rock, amounting to about 10,000 tons per year. Processing of the 10,000 tpy of crushed rock is performed by existing Kaiser personnel. The value of this activity is approximately $6,500 per year. Dismantling and removal of the ore processing equipment is in progress.

b. Lake Tamarisk

The community of Lake Tamarisk was originally developed in the 1960s by Kaiser Steel Corporation as a housing and recreation area for its management employees. The development consists of about 70 privately owned single-family homes, two recreational lakes, a nine-hole golf course, a 150-space recreational vehicle trailer park, and about 150 undeveloped lots owned by Kaiser Steel Resources. Approximately 65 single-family homes are currently occupied in Lake Tamarisk. Approximately 50 persons stay at Lake Tamarisk on a seasonal basis (Stokes, Kaiser Steel Resources, 6/30/89). Lake Tamarisk also has a senior center, recreation center, County fire station, County branch library, churches, and a pro shop associated with the golf course. The population of Lake Tamarisk changed little with the closure of the mine in 1982.

c. Desert Center

The area's commercial services are found primarily in Desert Center, at the junction of Interstate 10 and State Route 177. The community of Desert Center has an estimated 1989 population of 27, housed in 13 dwelling units. All of the single-family residences are currently occupied. A post office, two gas stations, three mini-markets, a cafe, a drive-in, and a bar provide services to the traveling public and residents of the area, including Eagle Mountain. There are also two trailer parks in the area containing 150 spaces (approximately 10 are currently occupied). Prior to the mine closure in 1982, the trailer parks were full. Most of the resident population is employed in the highway services businesses.

2. Socioeconomics

a. Local

County Services Area (CSA) 51 consists of the community of Desert Center made up of 70 homes. 150-space recreational vehicle park, and 100 developed lots along a one-mile length of Kaiser Road, two miles north of Desert Center. It also includes the communities of Lake Tamarisk and Eagle Mountain. CSA 51 provides water, sewer, and trash disposal for the community along Kaiser Road and Desert Center. Table 13 reflects the CSA 51 budgets for the years 1977–1980 when Kaiser Steel Corporation was still very active and the years 1988–1989 when the mine had ceased most of its operations. The 1978 budget is very close to the 1988 budget. Ten years of inflation alone would have doubled the budget of 1978. Therefore, the current budget reflects only a minimal caretaker budget.

The town of Eagle Mountain had a population of approximately 3,700 persons requiring all of the services discussed below. In 1979 Proposition 13 caused the service area to lose its tax base, and hence, revenues decreased. Prior to Proposition 13, the bulk of the budget stemmed from property taxes within the area, that is, the plant facilities and homes. From 1968–1978 Kaiser Steel Corporation made an annual $60,000 cash contribution to the County for CSA 51 over and above any property taxes. Kaiser discontinued this practice in 1979, which is reflected in the drop in revenue in the table below. From that point on, the largest single item in the revenues to the CSA 51 is an appropriation from the board of supervisors out of the County budget.

TABLE 13
COUNTY SERVICES AREA 51
1977–1980 AND 1988–1990 BUDGET

Year	Revenue	Expenditures
'77–'78	$366,368.00	$366,368.00
'78–'79	336,227.00	336,227.00
'79–'80	277,115.00	277,115.00
'88–'89	357,018.00	$353,644.00
'89–'90	358,620.00	—

b. Regional

The proposed landfill intends to service Los Angeles, San Bernardino, Riverside, and Orange counties. Therefore, these counties may be considered the region most likely to be impacted economically by the project. The San Gabriel Valley has been the disposal site for almost 50 percent of Los Angeles County's solid waste. With declining landfill capacities and strong opposition to trash incineration, the cities of the San Gabriel Valley began serious consideration of a wide range of alternative waste disposal options, particularly rail haul of waste to outlying counties, recycling, and composting (SCAG 1988:1-2). In April, 1988, SCAG published "The Feasibility of Hauling Solid Waste by Railroad from the San Gabriel Valley to Remote Disposal Sites." Because the San Gabriel Valley is so typical of the area potentially served by the proposed project, the results of that report are used in the regional economic impact analysis in this draft EIS/EIR. Copies of this report may be obtained from SCAG or reviewed at the Desert Center library.

I. Geology and Mineral Resources

The following discussion is based on research done by SCS Engineers, Inc.

1. Soil and Geologic Conditions

a. Rock Sequence

The Eagle Mountains and other upland areas are composed primarily of Paleozoic metasedimentary and Mesozoic granitic rocks (Dubois and Brummett 1968; Collins 1982). Figure 63 shows the geology of Eagle Mountain Mine. These rocks also outcrop in outliers of the mountains which extend into the valley. Cenozoic alluvial sediments form the bulk of the fill in the Chuckwalla Valley. Minor deposits of alluvium fill the bottoms of the larger stream channels within the mountains. In addition to the alluvial deposits, lake bed and windblown sand (dune) deposits are also found in the valleys. The rocks and sediments present in the area are described below in order of age, starting with the oldest.

The oldest rocks in the area are gneiss and schist of assumed Precambrian age. Limited exposures are found in the mine area, although larger areas are present in the southern Eagle Mountains. The gneiss is banded and is composed of quartz, orthoclase, and biotite. Biotite schist composed of layers of biotite alternating with quartz/feldspar layers is also present. In places, the biotite and feldspar content is so low that the rock grades into a quartzite. The exposures of these rocks in the mine area are only along the main haul road southeast of the Black Eagle Pit. In this area, the gneiss is unconformably overlain by the lower quartzite unit (see below) and has discordant contact with the quartz monzonite.

A sequence of metamorphosed sedimentary rocks of probable Paleozoic age is the next youngest in the area. As determined by surface mapping and interpretation of drill hole data, the Paleozoic rock sequence is as follows, from oldest to youngest: lower quartzite, schistose meta-arkose, lower marble, middle quartzite, upper marble, and upper quartzite. The thickness of these units when combined ranges from a minimum of 1,200 feet to greater than 2,200 feet. Much of the lower and upper marble units have been replaced by calc-silicate rock (tremolite-actinolite) and the iron ore body. This series of rocks is well exposed in the East Pit.

The largest part of the Eagle Mountains is composed of granitic rocks of probable Cretaceous age. The most common rock type is a porphyritic quartz monzonite that occurs as sill-like bodies in the Eagle Mountain Mine area. Small bodies of granodiorite and quartz diorite also occur in the Eagle Mountains.

The quartz monzonite is predominantly medium-grained and usually contains phenocrysts of potassium feldspar up to several inches across. The color of the rock ranges from light to dark

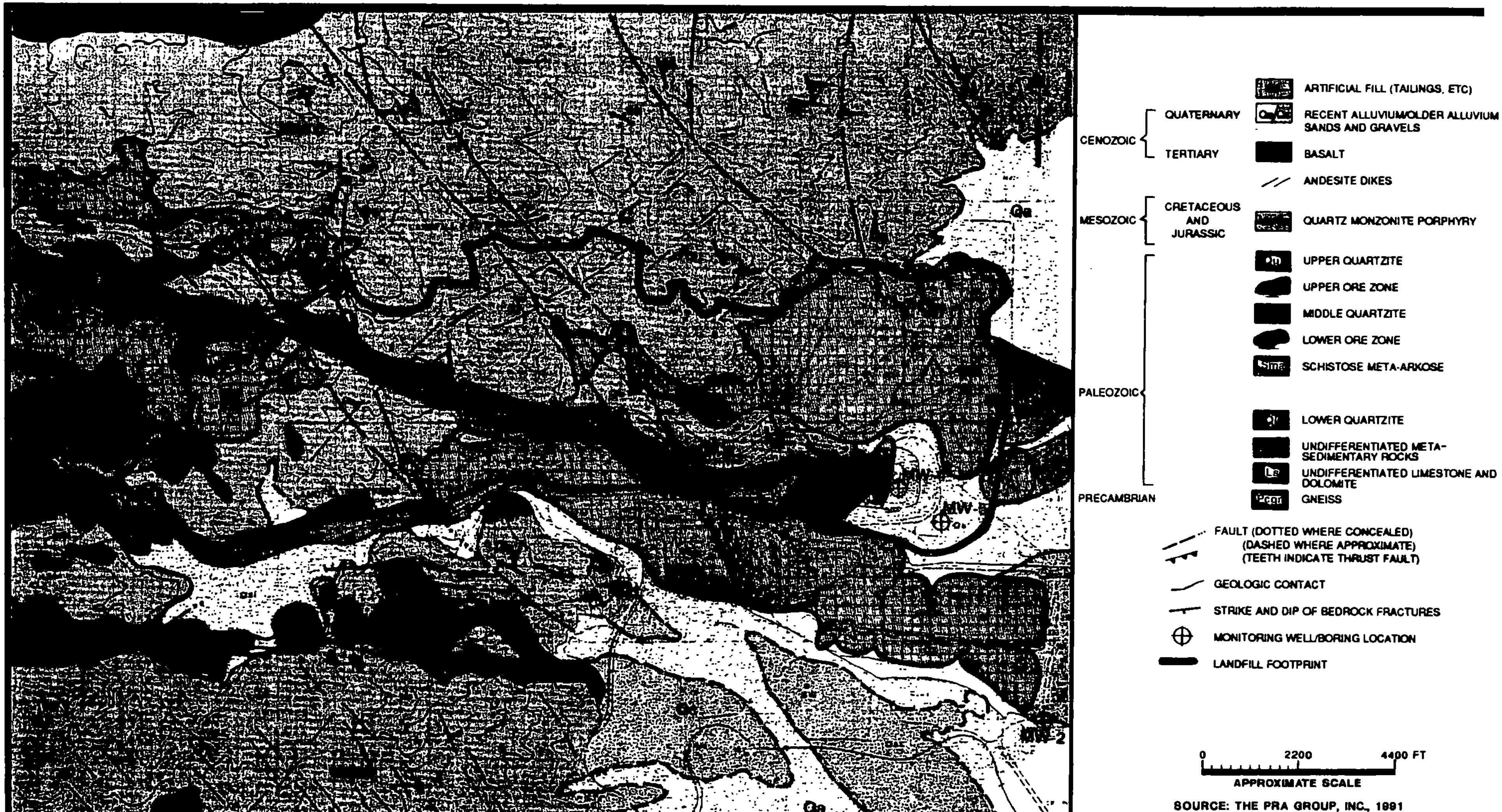


FIGURE 63.

GEOLOGY OF EAGLE MOUNTAIN MINE AREA

gray to green, depending upon the percentage of mafic minerals and the degree of alteration. The rock is composed primarily of subequal proportions of quartz, potassium feldspar, and plagioclase. Mafic minerals which may comprise up to 20 percent of the rock are primarily augite, hornblende, and biotite. In many areas, the rock has been affected by greenschist grade alteration that may have occurred at the same time as the ore- forming process. The alteration consists of the replacement of mafic minerals by epidote and chlorite, and feldspars by epidote, sericite, and clay minerals. The alteration may be intense in places, particularly adjacent to ore bodies and near fractures.

The area is cut by numerous andesite and andesite porphyry dikes that postdate the porphyritic quartz monzonite and other granitic rocks. The dikes also postdate the major period of folding. Most of the dikes are oriented in a northwest direction. The dikes are visible in the walls of the East Pit. Aplite dikes are also present in the area, although they are not as numerous as the andesite dikes.

Scattered outcrops of Tertiary volcanic rocks are found throughout the area. The rocks are primarily lava flows of basaltic composition. In the Eagle Mountains, several small bodies of volcanic rock are located south of the Eagle Mountain Mine. The most prominent occurrences of volcanic rock are at the gap separating the Pinto Basin and the Chuckwalla Valley and in the vicinity of the Eagle Mountain pumping station about four miles south of the mine.

Tertiary and Quaternary sediments fill the valley between the Eagle and Coxcomb mountains to depths of greater than 1,000 feet in the center of the valley. The sediments are predominantly sand and gravel alluvial fan deposits derived from the surrounding mountains, but sediments derived from an exotic source are also present. In addition to alluvial fan deposits, lake bed and sand dune deposits are found, but in much smaller volumes. Based on extensive drilling in the area east of the East Pit (Kaiser's Desert Eagle claim), the sediments have been divided into three major units, which are discussed in the sections below.

Lower Unit

A section of sand and gravel between 20 and 50 feet thick overlies the bedrock at least in the area to the east of the East Pit. This material is made up of sediment derived from the adjacent mountains. This is based on the presence of distinctive rock types, specifically the iron ore and associated calc-silicate granofels.

Middle Unit

This unit has been described differently depending on the source referenced. According to Dubois and Brummett (1968), this unit is up to 1,200 feet thick in places and is composed of silts and fine to coarse sands. This material has an overall quartz-rich composition and uniform particle size. This section shows a lack of material with a recognizable source in the surrounding mountains, suggesting it was derived from somewhere else and transported.

A drill log and description of borehole "U" from the Desert Eagle prospect (approximately two miles east of the East Pit) describes this zone as Tertiary sediments. These sediments are described as consisting of layers of clay, shale, silt, gypsum, and sand. No lower unit is differentiated on the log. Three high-porosity zones, at 612 to 628, 635 to 641, and 1,080 to 1,160 feet, are distinguished.

Upper Unit

The upper unit is up to several hundred feet thick and is similar to the lower unit. It is composed of sand and gravel which, like the lower unit, contains clasts of iron ore. These deposits are unconsolidated to semiconsolidated and include the major water-bearing zone within the Chuckwalla Valley. The details of the hydrogeologic and water quality properties of this unit are discussed in more detail in Section III.A., Water Quality.

b. Soils

Small windblown sand dune deposits are found in the Chuckwalla Valley in the eastern portion near the Coxcomb Mountains. Similar deposits may also exist in the subsurface.

Artificial fill deposits have been created as a result of mining activities at the site. They consist of coarse waste rock (overburden) and coarse and fine tailing derived from ore processing activities. The waste rock dumps are mainly on the north side of the East Pit and consist of material up to approximately five feet across. The coarse tailing are mostly in the less than three-quarter- inch range and make up a large pile south of the East Pit and two smaller piles within the pit. The fine tailing consist of silt and clay size material that was deposited as a slurry in ponds to the south and southeast of the East Pit. Other areas of artificial fill underlie the area of the mine processing facilities and roadbeds.

c. Structures

Folding

The metasedimentary sequence has been folded into a large east/west-trending anticline that extends completely across the Eagle Mountains. All of the major iron ore bodies are found on the north limb of the anticline; however, some small isolated areas of mineralization are found along the axis of the anticline where it is exposed at the surface. The rocks in the mine area on the north limb of the fold strike approximately north 80 degrees west and dip generally 45 degrees north. Drilling has shown that the dip increases with depth. Numerous small-scale monoclinal folds are found throughout the area.

The massive nature of the quartz monzonite makes it difficult to observe folding within this body except where it is in contact with the metasedimentary rocks. The sill-like nature of these intrusions makes the structure more apparent in these areas. Structural mapping and borehole data compiled by Kaiser geologists and outside consultants (Dubois and Brummett 1968) show that the quartz monzonite has a similar structure to the metasedimentary rocks. Either the quartz monzonite was intruded along the preexisting fold pattern or was folded at the same time as the older rocks. It is most likely that the folding occurred at the time of intrusion (probably Cretaceous) of the quartz monzonite while it was in a liquid or semiliquid state.

Faults

Most of the faults in the Eagle Mountain Mine area have a northwest strike, although east-west and northeast-trending faults have also been observed. Most of the faults have near vertical dips with displacements ranging from a few to several hundred feet. Both normal and reverse movement have been observed (Dubois and Brummett 1968). The only fault observed during reconnaissance of the presently exposed rocks of the East Pit has a northwest strike and a near vertical dip (Figure 64). The fault was not a single break, but rather a zone of highly fractured rocks approximately 20 feet wide. The direction of displacement is not clear. The fault is old enough that it does not offset the Quaternary alluvium on the south side of the pit. The most recent movement on this fault is thus sometime prior to deposition of the alluvium.

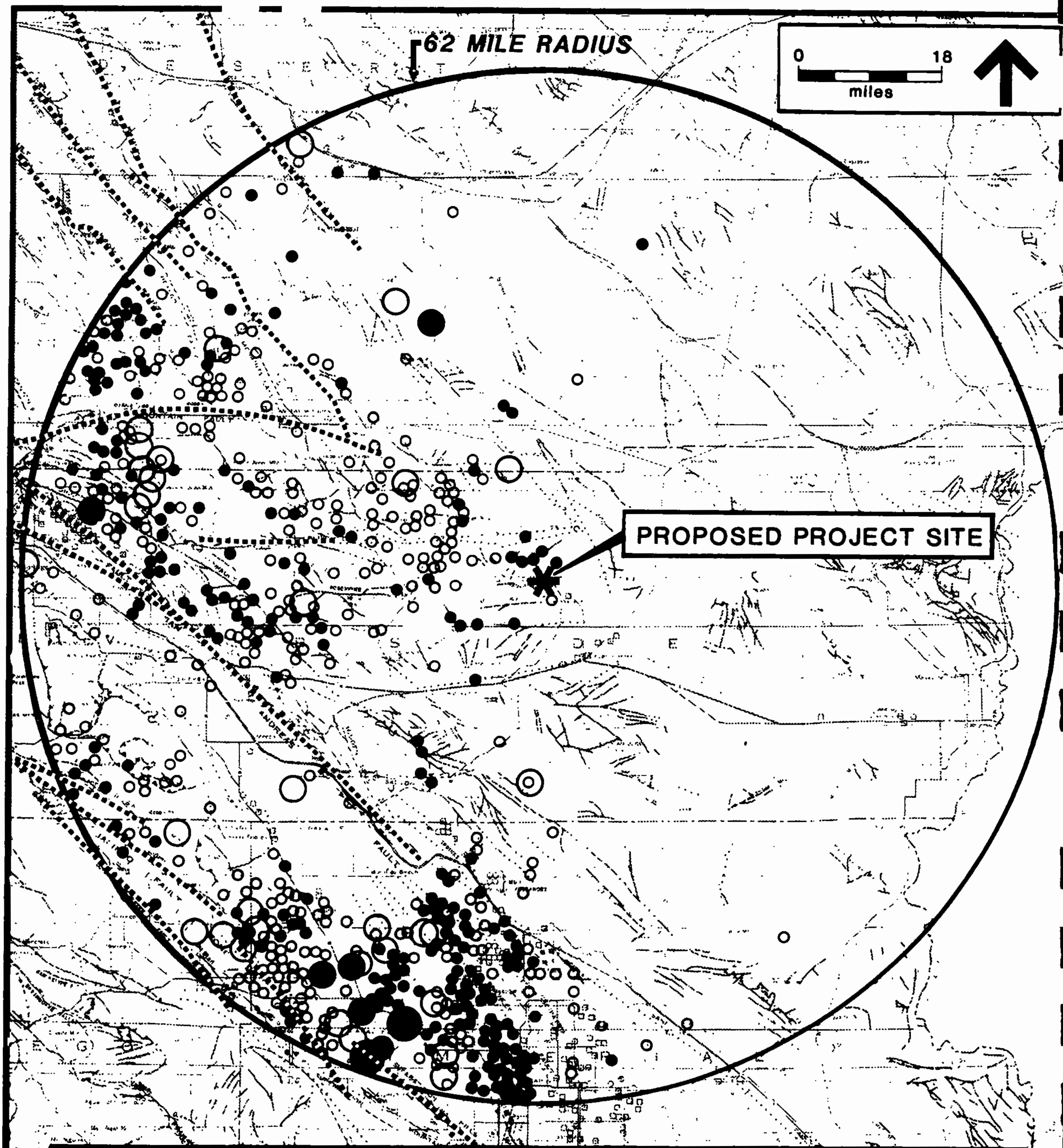
Joints/Fractures

Rocks in the Eagle Mountain Mine area show a well-developed joint pattern. In the East Pit, two prominent joint sets were observed. One set strikes approximately north 35 degrees west and dips between 60 degrees southwest and 80 degrees northeast. The other site has a strike direction that varies from north 60 degrees west to north 70 degrees east and a dip of between 45 and 75 degrees north. This latter set forms prominent surfaces on the south side of the pit that dip into the pit and have acted as slope failure surfaces in the past. The joints are most prominent in the quartz monzonite and quartzite units. Other workers have concluded that fracture orientation varies between different areas within the mine and between different rock types.

The orientation and distribution of joints is important to this study, because if interconnected, they may form a pathway for groundwater movement.

Photolineaments and Faulting

Eight photolineaments extend through the site (Schaefer Dixon Associates 1989). Six of the photolineaments are fairly well expressed by an apparent alignment of topographic low points or "saddles" along the base of the northwesterly trending hills, tributary drainages within these hills, and tonal changes within the alluvial portions east of the project area. The origin of these



MAJOR QUATERNARY FAULT ZONES

MAGNITUDE 3.0–4.4, YEARS 1808–1969

MAGNITUDE 3.0–4.4, YEARS 1970–1987

MAGNITUDE 4.5–6.4, YEARS 1808–1969

MAGNITUDE 4.5–6.4, YEARS 1970–1987

MAGNITUDE ≤ 6.5, YEARS 1808–1969

MAGNITUDE ≤ 6.5, YEARS 1970–1987

SOURCE: THE PRA GROUP, INC., 1991

FIGURE 64. ACTIVE FAULTS AND SEISMICITY MAP (62 MILE RADIUS)

RECON

photolineaments is unknown at present but may represent areas of deep weathering along bedrock fractures, differential weathering between adjacent rock units, or faulting. Two photolineaments strike in a northeasterly direction and appear to be resistant bedrock outcrops related to dikes or sills.

Numerous northwesterly striking, steeply dipping faults cut the project area; both normal and reverse movements have been noted (Collins 1982). How recent the activity of these faults is has not been evaluated or documented in the literature.

The nearest known active faults are the Pinto Mountain fault and the Bullion Mountain fault, approximately 25 and 28 miles to the northwest, respectively. The Blue Cut fault, at a distance of 21 miles, is the closest potentially active fault within the project vicinity.

The East Pit has been excavated into bedrock in the western part and alluvium in the eastern part. The contact between bedrock and alluvium is unconformable and dips approximately 30 degrees to the east as exposed in the walls of the pit. A ridge of bedrock that has been partly excavated runs north-south in the eastern part of the pit.

2. General Site Seismicity

Earthquakes that may occur on the Pinto Mountain, Bullion Mountain, Blue Cut, and southern San Andreas faults are capable of generating very strong ground shaking at the project site. Such potential for ground shaking is common within the highly seismic southern California region, as well as the project area. Figure 64 presents a compilation of the known active or potentially active faults within a 62-mile (100-km) radius of the project site and shows the historic seismicity from 1900 to 1988 for earthquakes with magnitudes greater than 4.0.

The Blue Cut fault, 21 miles to the west, is the active fault zone closest to the project area, while the Coyote Creek branch of the San Jacinto fault is the farthest, 62 miles to the southwest. Maximum earthquake magnitudes for the active fault zones near the project area range from 6.2 for the Ludlow fault (44 miles to the northwest of the site) to 7.5 for the San Andreas fault (34 miles to the southwest). Maximum earthquake magnitudes for the Blue Cut and the San Jacinto faults (Coyote Creek branch) are 6.8 and 6.6, respectively.

3. Mineral Resources

The project area is the site of the largest iron mining/steel making operation west of the Mississippi River. Iron mining operation began in the early 1940s and continued until 1982, when a combination of environmental and economic conditions caused operations to cease. Most of the ore processing and refining facilities have been removed. Three large open pits (approximately one to two miles long) were excavated during Kaiser's operations at the Eagle

Mountain Mine. These are named the Black Eagle Pit (westernmost), Central Pit, and East Pit (formerly known as the North-South Pit). The East Pit, which is proposed for use for landfilling, is approximately two miles long in an east-west direction, 2,000 feet wide north to south, and 400 to 800 feet deep. Small-scale gold and base metal mining has been carried out in the Eagle Mountains, most of it before the iron mine was in operation. Some recovery of coarse tailing for aggregate from the spoils piles and surface recovery of riprap and decorative stone in portions of the Central and Black Eagle pits exists currently.

a. Iron Ore Resources

Data, found in Table 14, regarding geologic iron deposits at the Eagle Mountain Mine in January, 1983 (Kaiser Steel Resources 1990; SCS Engineering 1990) show that approximately 335 million tons of iron-bearing material grading from 34.7 to 48.5 percent iron exist in nine separate resource areas at the mine (Figure 65). In addition to net tonnages, Table 14 shows average iron content for each resource area and the anticipated iron unit recovery (calculated based on Kaiser's recovery factors at the time of mine closure).

Of the iron resources at Eagle Mountain, only approximately 170 million tons (1.05 percent of U.S. reserves) were considered to be economically recoverable at the time of the mine closure (Table 15).

Open pit reserves based on an average stripping ratio of 3:1 exist in six discrete areas at Eagle Mountain. Percentage figures for each area reflect the percentage of the total reserves (resources economically recoverable in 1983). These are as follows:

East Pit - Alluvial: Approximately 21 million metric tons (12.6 percent) of placer deposits which consist of discrete particles of high-grade iron ore in alluvial matrix (sand or gravel).

East Pit - Midsection: Approximately 4.8 million metric tons (2.8 percent) of lode deposit. A lode is defined as a mineral deposit in a consolidated rock.

East Pit - West Extension: Approximately 6.8 million metric tons (4.0 percent) of lode deposit.

Central Pit: Approximately 65 million metric tons (37.9 percent) of lode deposit.

Black Eagle - North: Approximately 35 million metric tons (20.5 percent) of lode deposit.

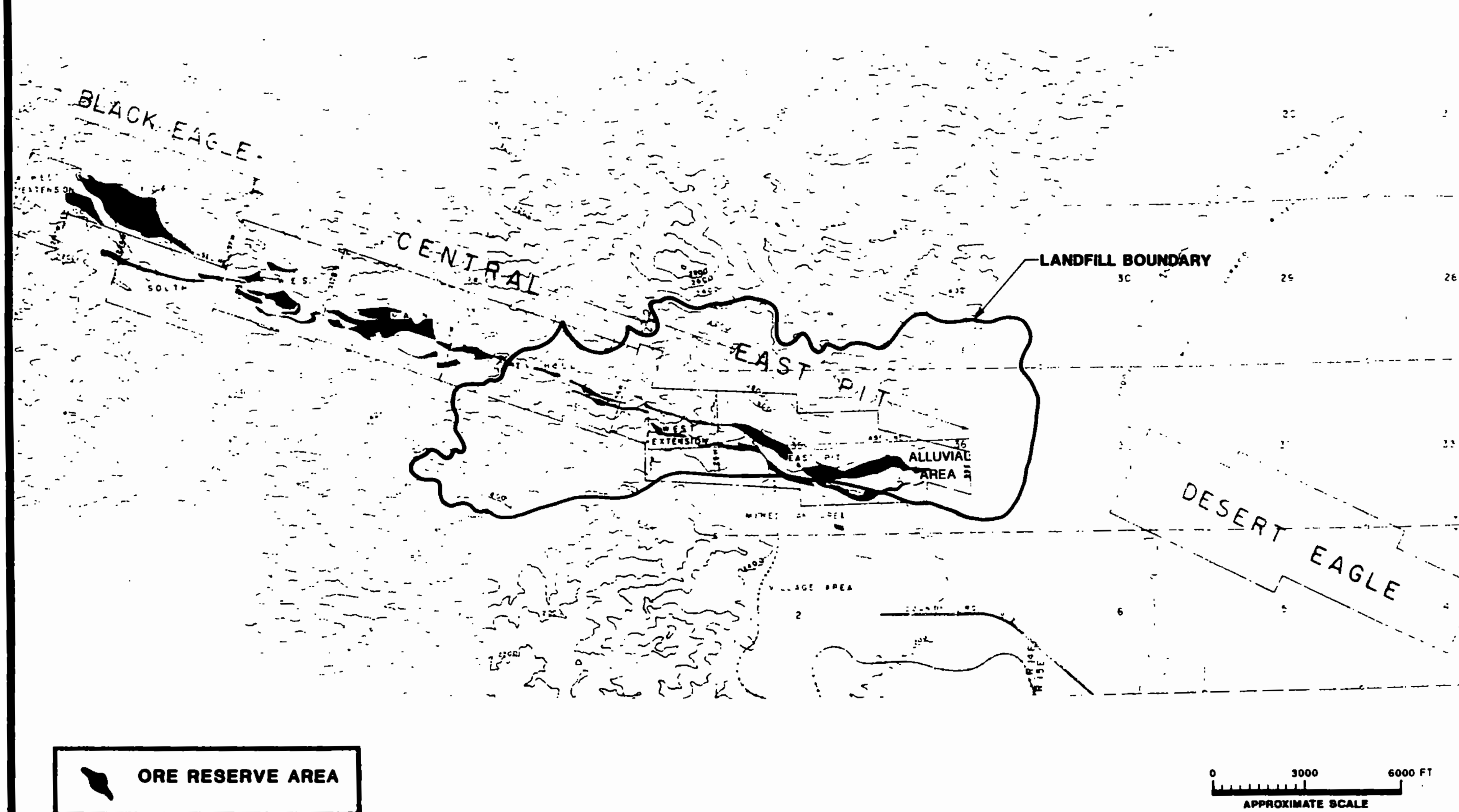
Black Eagle - South: Approximately 37.7 million metric tons (22.1 percent) of lode deposit.

TABLE 14
EAGLE MOUNTAIN GEOLOGIC ORE RESERVES
(As of January 1, 1983)

Resources	Metric Tons	Percent Fe	Million Units: Total Fe Units	Million Units: Recoverable Fe Units*
Measured				
East Pit	28,431,454	39.7	1,128.7	756.2
East Pit - West Extension	7,177,775	46.7	335.2	224.6
Central - TV Hill	48,061,239	37.3	1,792.7	1,201.1
Central - Main	42,265,029	37.3	1,576.5	1,056.2
Central - West	22,231,617	38.3	851.5	570.5
Black Eagle - North	49,785,843	39.6	1,971.5	1,320.9
Black Eagle - South	11,236,800	40.2	451.7	302.7
Black Eagle - West Extension	1,597,826	38.6	61.7	41.3
Desert Eagle	28,044,000	48.5	1,360.1	911.3
Subtotal	238,831,583	39.9	9,529.6	6,384.8
Indicated				
East Pit	10,639,420	42.4	451.1	302.2
East Pit - West Extension	5,503,346	44.3	243.8	163.3
Central - TV Hill	15,364,944	37.4	574.6	385.0
Central - Main	6,361,767	40.2	255.7	171.3
Central - West	8,536,628	38.5	328.7	220.2
Black Eagle - North	19,401,207	37.8	733.4	491.4
Black Eagle - South	5,058,600	34.7	175.5	117.6
Black Eagle - West Extension	1,009,008	38.2	38.5	25.8
Desert Eagle	24,826,000	41.1	1,020.3	683.6
Subtotal	96,700,920	39.5	3,821.6	2,560.5
TOTAL	335,532,503	39.8	13,351.2	8,945.3

SOURCE: SRS Engineers 1991

*An Fe unit recovery of 67 percent was used based on past plant performance and metallurgical tests on drill core.



SOURCE: THE PRA GROUP, INC., 1991

FIGURE 65. LOCATION OF ORE RESERVE AREAS

TABLE 15
EAGLE MOUNTAIN MINE OPEN PIT RESERVES
REMAINING IN THE FINAL PIT DESIGN

Pit	Bene Plant Ore Metric Tons	Bene Plant Ore % Fe	Bene Plant Ore % S	Pellet Plant Ore Metric Tons	Pellet Plant Ore % Fe	Pellet Plant Ore % S	Metric Tons Total Ore	Total Fe Units	% of Total Fe Units	Metric Tons Waste	Metric Tons Total Material	S/R*
East Pit - Alluvial	21,133,604	24.7	0.05	279,169	40.3	0.40	21,412,773**	5,220,000	8.4	59,783,151	81,195,924	2.79
East Pit - Midsection	2,786,920	47.7	0.18	2,009,851	48.9	0.93	4,796,771	2,312,178	3.6	14,516,376	19,313,147	3.03
East Pit - West Extension	3,577,598	44.2	0.13	3,246,212	50.3	0.73	6,823,810	3,214,143	5.1	33,728,814	40,552,624	4.94
Central	18,882,600	37.7	0.40	45,762,907	37.7	1.38	64,645,507	24,371,356	38.5	139,981,215	204,626,722	2.17
Black Eagle - North	3,947,404	33.5	0.08	31,074,285	39.1	1.76	35,021,689	13,472,426	21.3	123,730,217	158,751,906	3.53
Black Eagle - South	27,896,125	38.8	0.13	9,855,076	38.3	0.82	37,751,201	14,598,191	23.1	172,136,309	209,887,510	4.56
TOTAL	78,224,251	35.0	0.17	92,227,500	38.9	1.41	170,451,751	63,188,294	100.0	543,875,982	714,327,733	3.19

SOURCE: SCS Engineers 1991

*S/R = Stripping ratio.
**Included in the total ore tonnage for the East Alluvial pit is state-owned ore.

Approximately 92 million metric tons of iron ore reserves at Eagle Mountain (or 54 percent of the total open pit reserves at the mine) are magnetite mixed with pyrite. These deposits have an average iron content of 38.9 percent and an average sulfur content of 1.41 percent (see Table 15). Production of marketable concentrates from such crude ore requires a fairly sophisticated flow scheme involving mineral jigs, heavy media separation, and magnetic concentration with pelletization.

Similarly, approximately 78 million metric tons of iron reserves at Eagle Mountain (or 46 percent of total open pit reserves at the mine) are mixtures of magnetite and hematite, with small amounts of pyrite. These deposits have an average iron content of 35.0 percent and a sulfur content of 0.17 percent. Production of marketable concentrates from this type of crude ore requires even more sophisticated flow schemes than for magnetite.

In most resource areas, iron ore exists in lode deposits which require sophisticated concentrators to produce saleable products. The only exception is the East Pit - Alluvial resource area, where 21.4 million metric tons of iron ore reserve is present in placer deposits. Although this resource area contains the lowest average iron content of any of the resource areas, the ease with which concentrates could be obtained from this placer material in a relatively unsophisticated concentrator, combined with the nearness of the resource area to the railhead and the relatively low mining costs experienced in this area, renders the East Pit - Alluvial resource area a likely site for future mining.

The ore crushing and concentrating facilities at the Eagle Mountain Mine have been dismantled for salvage, and the mining equipment has been sold. In addition, much of the infrastructure required to support the operation was completely abandoned in 1986 with the suspension of mining activities. Consequently, no concentrating can presently be performed at this mine.

Since 1948, approximately 100 million tons of high-grade iron ore concentrate has been shipped from the Eagle Mountain Mine. Initially, all mining was performed from replacement deposits in bedrock. More recently, an alluvial deposit of ore derived from erosion of the bedrock ore body was mined (eastern part of the East Pit).

b. Precious Metals

Following suspension of iron ore mining, the open pits and areas along strike, in the footwall, and in the hanging wall of the iron ore deposits were examined for precious metals by Kaiser, Pincock, Allen and Holt, Inc., Homestake Mining Company, Newmont Mining Corporation, the Goldfield Corporation, and Kiewit Mining Company. No precious metals were detected at any of the above locations (Kaiser Steel Resources 1990).

Two samples were collected by Kaiser from the discharge point of fine plant tailings into tailings basins 3 and 6. Fire assaying of these samples did not indicate the presence of gold (Appendix G).

In addition, coarse plant tailings were sampled and analyzed for precious metals. Twenty samples were collected from different locations on the coarse tailing stockpile T-6. These samples were first evaluated by fire assaying at Eagle Mountain. These analyses showed traces of gold in two samples (see Appendix G).

To confirm the above results, splits of the original 20 samples were sent to Skyline Labs, Inc., for gold and silver content analyses by atomic absorption. The results did not indicate the presence of gold in any samples; traces of silver were detected in six samples (see Appendix G).

Additional splits of the original 20 samples were sent to the Monitor Geochemical Laboratory. Analyses did not indicate the presence of gold in any of the samples; silver was detected in low (uneconomic) concentrations in three samples (see Appendix G).

c. Industrial Minerals

Some recovery of coarse tailing for aggregate from the spoils piles and surface recovery of riprap and decorative stone in portions of the Central and Black Eagle pits exists currently. These operations are estimated at a volume of approximately 10,000 tons per year and are regulated by County Ordinance No. 555, which implements the state Surface Mining and Reclamation Act (Public Resources Code, Section 2710 et seq.). This ordinance requires issuance of a permit and approval of a reclamation plan of mined areas. Such a permit has been approved by the County for the Kaiser operation.

Also, areas underlain by alluvial fan deposits in the southeastern portion of the land exchange area contain sand and gravel that may be of commercial grade (Morton 1991).

J. Visual, Recreation, and Wilderness Resources

1. Visual Resources

The visual assessment of the study area has utilized the BLM's Visual Resource Management System (BLM n.d.). Landscape character types were defined and scenic quality evaluated in the context of the regional landscape character. Key observation points (KOPs) and corridors were established and the visual sensitivity of the project area was determined based on the views from these points. A visual contrast rating was completed for the existing conditions of the project area.

a. Regional Landscape Character

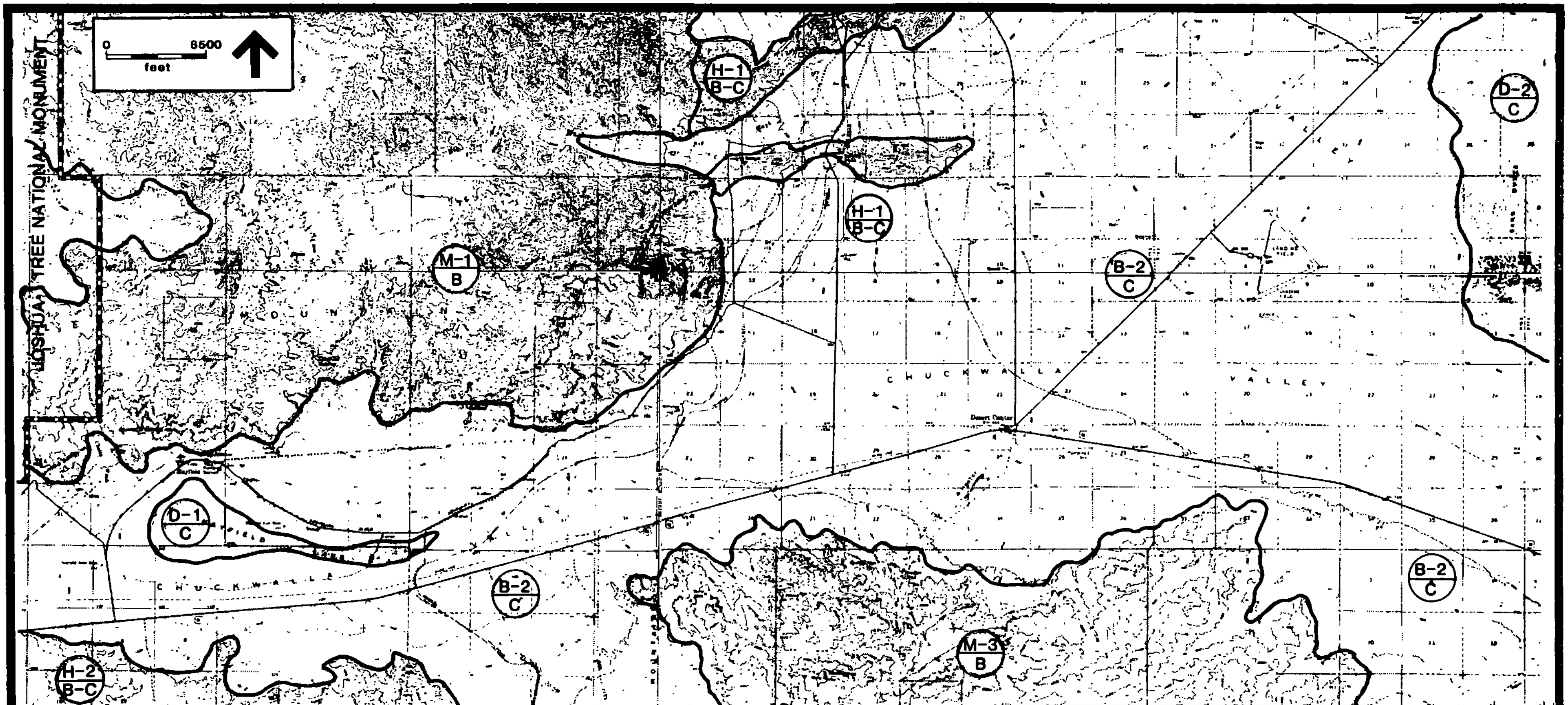
The project area is located within the Basin and Range province, which is characterized by extensively eroded mountain ranges separated by broad, relatively flat alluvial valleys. The Mojave and Sonoran deserts, both major North American deserts, lie within this province. North and west of the project area is the Mojave Desert, an upland high desert with stands of Joshua trees and elevations above 2,000 feet. South and east of the Mojave Desert there is a drop in elevation through the transition zone and down into the Colorado Desert, the most arid subdivision of the Sonoran Desert. Rainfall averages less than four inches per year. The elevation of the valley floors is under 1,500 feet. Pinto Basin, the Chuckwalla Valley, the Coxcomb and Chuckwalla mountains, and the Eagle Mountains, including the project area, are in the Colorado Desert.

b. General Scenic Interest

The scenic quality in the area consists primarily of sweeping panoramic views across the broad valley floors to the surrounding mountains. A strong contrast is created by the abutment of these two basic landforms. Added to this are daily changes in lighting, sun angles, shadow patterns, colors, and the dynamic skyscape: storms, cloud formations, sunrises, sunsets, and starry nights.

c. Landscape Character Types and Scenic Quality

Landscape character types within the study area include mountains, steep hills, basins and bajadas, dunes and dry lakes, and the mine area with its associated facilities. A brief description of the character and scenic quality of each type follows, and Figures 66 and 67 depict the landscape character and scenic quality.



Landscape Character Type — A-0 — Rating Unit

0 — Scenic Quality Rating

LANDSCAPE CHARACTER TYPES AND UNITS			SCENIC QUALITY RATING	
Mountains	M.1	Eagle Mountains	B	Medium
	M.3	Chuckwalla Mountains	B	Medium
Steep Hills & Foothills	H.1	Eagle Mountain Foothills	B-C	Medium-Low
	H.2	Orocopia Mountain Foothills	B-C	Medium-Low
Basins & Bajadas	B.2	Chuckwalla Valley	C	Low
Dunes & Dry Lakes	D 1	Hayfield Dry Lake	C	Low
	D 2	Chuckwalla Valley Dunes	C	Low

FIGURE 66. SCENIC QUALITY, SOUTHERN PORTION

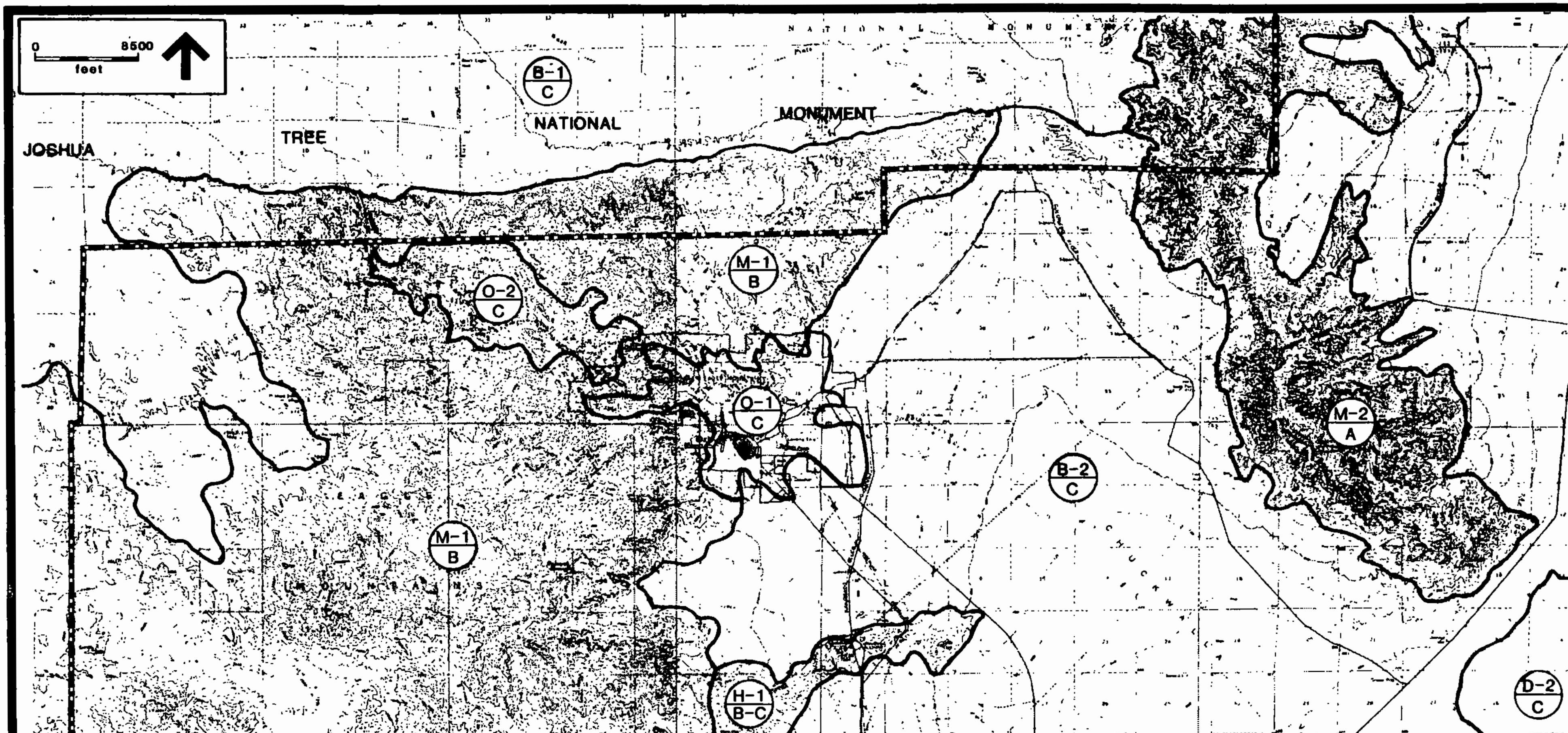


FIGURE 67. SCENIC QUALITY, NORTHERN PORTION

A-O — Rating Unit
Q — Scenic Quality Rating
Landscape Character Type

LANDSCAPE CHARACTER TYPES AND UNITS			SCENIC QUALITY RATING	
Mountains	M 1	Eagle Mountains	B	Medium
	M.2	Coxcomb Mountains	A	High
Steep Hills & Foothills	H 1	Eagle Mountain Foothills	B-C	Medium-Low
Basins & Bajadas	B.1	Pinto Basin	C	Low
	B.2	Chuckwalla Valley	C	Low
Dunes & Dry Lakes	D 2	Chuckwalla Valley Dunes	C	Low
Mined Areas & Associated Facilities	O.1	Eagle Mountain	C	Low
	O.2	Black Eagle	C	Low

Mountains

M.1 Eagle Mountains
M.2 Coxcomb Mountains
M.3 Chuckwalla Mountains

Landscape Character: These mountain areas are characterized by extremely rugged and rocky terrain rising sharply (25 percent slopes and greater) from the adjacent relatively flat desert floor. They are dissected by steep canyons formed by drainages that have wide, flat wash bottoms. Vegetation consists of a very sparse desert scrub cover which contributes to the coarse-textured appearance. Desert riparian trees occur along drainageways. The variation of color is darker than the adjacent lighter tan-brown and greens of the basins and includes shades of gray, mauve, brown, and tan. The variety of colors results in a mottled appearance caused in part by the active upthrust of lighter-colored materials through the darker overburden. This is characteristic of mountains throughout this area, and the Pinto Mountains to the north were named after this mottled, or "pinto," effect. The Coxcomb Mountains have the most rugged terrain. They are very angular and vertical, resulting from active uplift. There are rock spires up to 300 feet in height in some locations.

Scenic Quality: The scenic quality of these desert mountains is a result of the strong contrast with the adjacent basin landform, the variety of colors and hues, and the striking irregular form and skyline. They provide a backdrop of views and become the focus of attention. Within the immediate study area (see Figures 66 and 67), mountains have a higher scenic quality than any other landform. However, in a regional context, the Eagle Mountains and Chuckwalla Mountains are fairly typical and are representative of average scenic interest. The overall scenic quality is medium. The Coxcomb Mountains have a higher level of visual diversity and their scenic quality is rated high.

Steep Hills/Foothills

H-1 Eagle Mountain Foothills
H-2 Orocopia Mountain Foothills

Landscape Character: These landforms are adjacent to the more mountainous areas but are lower in elevation and smaller in scale. Colors are the same dark, muted shades of gray, mauve, brown, and tan. Vegetative cover is very sparse desert scrub, and in some cases, no cover exists.

Scenic Quality: The steep hills and foothills do lend visual variety to the area but lack the scale and vertical dimension of the mountains. The forms are more subdued and rounded. Overall scenic quality is medium-low.

Basins and Bajadas

B-1 Pinto Basin
B-2 Chuckwalla Valley

Landscape Character: Broad and expansive, these areas form a relatively flat to gently sloping base plane from which the mountains abruptly rise. The upper edges of the basins are typically characterized by bajada formations of gently sloping fanned areas of alluvial soil deposited by the drainage off the mountains. The bajada fanning out from the Coxcomb Mountains is more distinct than others. It is covered with coarse gravel with a dark surface, "desert pavement." Other colors of the basins and bajadas are lighter shades of tans and browns, as well as the various shades of green of the vegetative cover. In most areas there is an even, if sparse, distribution of trees and shrubs.

A variety of land uses occurs including the developed areas of Desert Center and Lake Tamarisk; a number of linear elements such as paved and unpaved roads, power lines, railroad tracks, and the Colorado River Aqueduct, as well as agricultural fields and a landing strip.

Scenic Quality: The contribution these basins and bajadas lend to the visual experience of the area is the expansive panoramic views across the desert floor to the surrounding mountain ranges, virtually uninterrupted by topographic relief. It is in contrast to these areas of low visual interest that the adjacent mountains gain significance. The land uses in the area, particularly the linear elements, add some visual variety, but detract from the simplicity of the landscape. The overall visual quality is low.

Dunes and Dry Lakes

D-1 Hayfield Dry Lake
D-2 Sand Dunes

Landscape Character: Although lying within the basin/bajada formation, these areas are distinctly different in their homogeneous form, line, color, and texture. The flat or slightly undulating areas are of an even color which is slightly lighter than the adjacent basins and are the lowest areas of the landscape. The vegetation ranges from a very sparse shrub cover to no cover at all.

Scenic Quality: The areas lack the striking visual quality of other dunes and dry lakes in the region due to the small scale and unconnectedness to other dune or dry lake areas. Overall scenic quality is low.

Mined Areas and Associated Land Uses

O-1 Eagle Mountain
O-2 Black Eagle Mines

Landscape Character: This highly modified landscape consists of open pit and surface mines, tailing piles, tailing ponds, plant operation and equipment areas, a sewage treatment plant, and a residential area associated with the mining operations. The landfill area makes up approximately 2,772 acres of the larger 4,695-acre project specific plan area. Extending up into the mountainous slopes, the mined areas are distinctly different from the adjacent undisturbed areas. The form of the mined area is defined by the repetitive slope and terrace grading which has created curvilinear bands of elevation change. Exposed cut or fill areas are of a lighter tan-gray color than the natural gray- brown-mauve of undisturbed areas. The tailing piles consist of the coarse tailing taken from the ore body and is a darker color similar to the surface rocks of the undisturbed areas. The slopes of the mine and tailing piles have a very regular, even appearance and texture, except for a few widely scattered rabbit bushes which have established themselves, compared with the ruggedness and coarseness of the natural topography.

Scenic Quality: The modifications of the mined area add significant visual variety to the scenic quality of the area. However, they create a strong disharmony with the form, line, color, and texture of the mountain formations in which they are located. Overall visual quality is low.

d. Seen-Area Analysis

Figure 68 illustrates a boundary from which the project site could be seen based on topography and identifies the KOPs and the distance zones. These topics are discussed in detail below.

Key Observation Points

Desert Center, Interstate 10, the Lake Tamarisk subdivision, State Highway 177, the Pinto Wash hiking route, and ridge points in both the Eagle and South Coxcomb mountains were designated as KOPs (see Figure 68). A KOP was not selected for the Chuckwalla Mountains because they are over 15 miles away from the project area. A seen-area analysis was conducted for each KOP with the focus on what can be seen when looking towards the project area.

Distance Zones

Within the seen area, the foreground/middle ground (less than 5 miles) and background (5-15 miles) distance zones were delineated for the KOPs (see Figure 68). The project area lies in the background view of all KOPs with two exceptions: depending on the height and angle of view, a number of ridge points in the Eagle Mountains have foreground/middle ground views

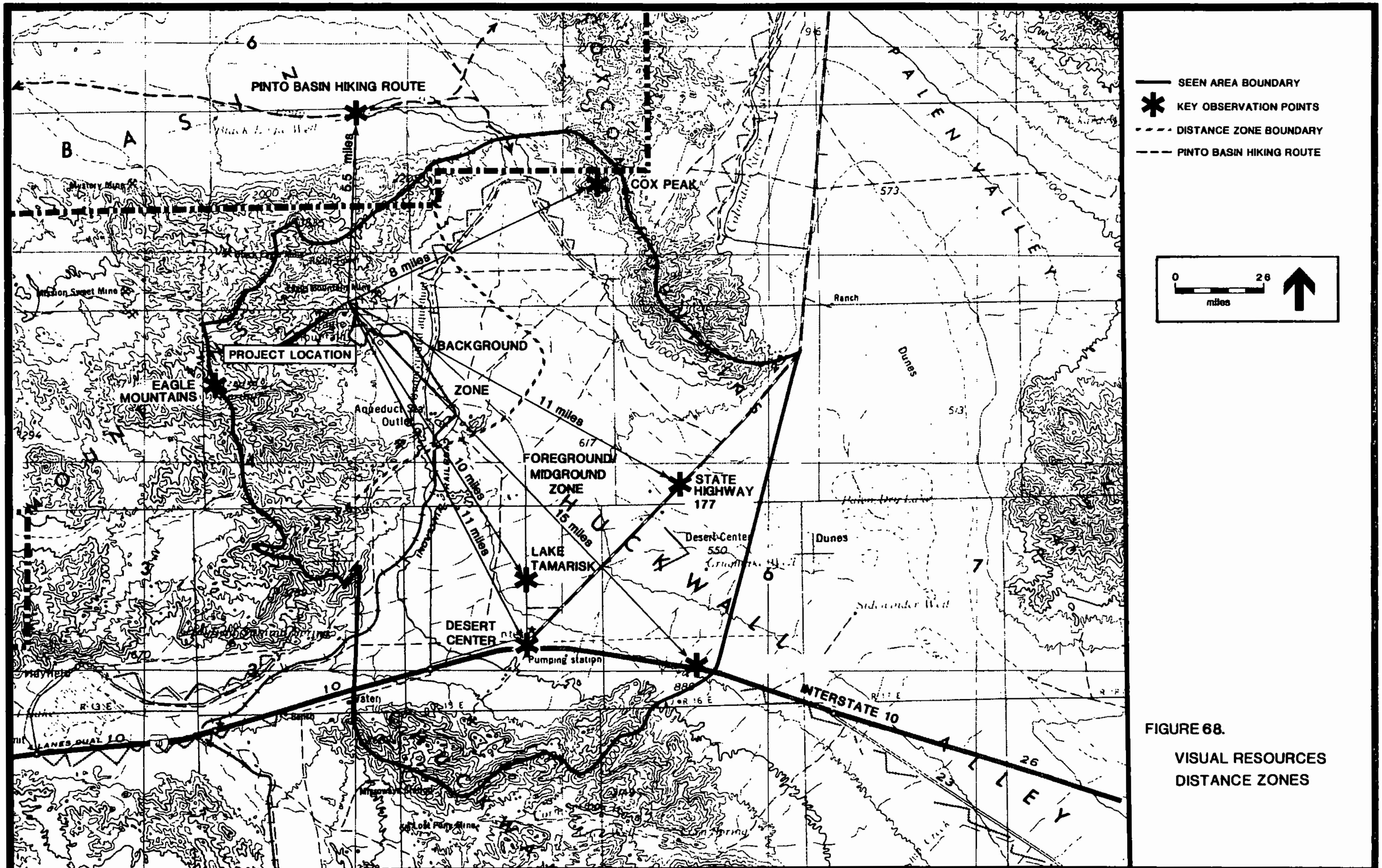


FIGURE 68.
VISUAL RESOURCES DISTANCE ZONES

R-2100E 12/89 2/91

of the project area, and the sky area above the project area is highly visible from the Pinto Basin hiking route and is within the south-facing foreground/middle ground of that route.

Views of Project Area and Viewer Attitudes

The views of the project area from each of the KOPs is described as follows:

Desert Center (elev. 900'). The views of the project area from Desert Center are significantly obstructed by the steep hills (elev. 1,200'-1,500') in the middle ground. These hills are five to seven miles to the northwest and block the view of most of the mined area and associated land uses, leaving only the upper slopes of the overburden piles visible in the background at approximately 12 miles. A close look is required to distinguish between the lighter slope areas and the naturally occurring lighter areas to the south of the mine. Visual contrast is evident but low. The sensitivity level of viewers is moderately low due to the distance, the partial screening of views, and the mine's existence in the area for over 30 years.

Interstate 10. Traveling from the west, views of the project area are blocked by the Eagle Mountains until a point approximately three miles west of Desert Center. From there to a point approximately three miles east of Desert Center, only the upper slopes are visible, as described above. The project area becomes noticeable to westbound travelers at a point between four and five miles to the east of Desert Center. The linear terraces, lighter slopes, and shadow patterns are barely noticeable at this distance of 15 miles. Visual contrast is low. Viewer sensitivity is moderately high due to the high volume of viewers and because the Eagle Mountains become a focal point for views across the Chuckwalla Valley.

Lake Tamarisk (elev. 750'). Although this area is two miles to the north of Desert Center, the change in the angle of view is not enough to provide any greater visibility of the project area than described for Desert Center. The steep hills in the middle ground still block most of the views, and vegetation within this residential area provides additional screening. Visual contrast level is low. Viewer sensitivity is moderately high due to the residential and recreational character of the land use.

State Highway 177. Desert Lily Preserve was selected as a KOP along this route. Although not indicated on any sign, it is shown on the BLM's desert access guide maps and attracts seasonal sightseers whose viewer sensitivity levels are high. Background views of the Eagle Mountains are accentuated by the Chuckwalla Valley in the foreground, but at a distance of 11 to 12 miles, the project area is barely visible. The mine areas are noticed as having slight variations in color and pattern. The even distribution of trees and shrubs provide additional screening of travelers' views. Visual contrast is low. Viewer sensitivity is potentially quite high.

Cox Peak (elev. 3,335'). Located in the Coxcomb Mountains just south of Joshua Tree National Monument, this point offers an unobstructed view of the surrounding landscape including the Eagle Mountains. The upper and western portions of the project area are screened from view by ridgelines, but the lower mine area and the associated land uses can be seen. Other peaks or ridge points further south in the Coxcombs have a full view of the project area. At a distance of approximately eight miles, the slopes, terraces, and tailing pile can be distinguished and the visual contrast level is medium. The sensitivity level of individual viewers would be high, but the volume of use these points receive is very low: most of the use of the Coxcomb Mountains occurs in the central or north portions.

Pinto Wash Hiking Route. The project area is not visible from this route because the Eagle Mountains form a ridgeline (elev. 2,000'–3,500') that blocks views. The sky area above the project site is highly visible though and is within the foreground-middle ground of the south-facing views of the route. Use volume is moderate as this is a common hiking route in the monument, particularly in the winter. Monument visitors in this area have expectations for a wilderness recreation experience; therefore, viewer sensitivity is very high.

Eagle Mountains. Depending upon the elevation and the angle of view, the project area can be highly visible or completely unseen from the surrounding mountains. Most people use the lower-elevation canyons and washes for recreation and do not see the project area, but hikers following the ridgelines have excellent views of the surrounding landscape, including the mine area. In fact, the ridgelines adjacent to the north and south of the mine provide the best nonaerial views of the project area. From these points all elements of the project are highly distinct and the visual contrast with the adjacent undisturbed areas is very high. Viewer sensitivity can range from high, for those people seeking a wilderness experience, to low, for those people seeking a better view of the mine area. Refer to Section IV.B.10 for simulations of views from the Eagle Mountains and from the Coxcomb Mountains.

e. Project Area Analysis

Sensitivity Level

The sensitivity level of an area is the measure of public concern for that area's scenic quality. For the project area, it is based on the types, locations, and quantity of viewers as well as general public interest as expressed in meetings and letters of concern. Although the sensitivity level of the viewers at different locations varies from high to low, the overall sensitivity level of the project area was determined to be moderate.

Existing Visual Contrast Level

The magnitude of past alterations to the landscape of the project areas has resulted in a high contrast with the form, line, color, and texture of the adjacent undisturbed landform and

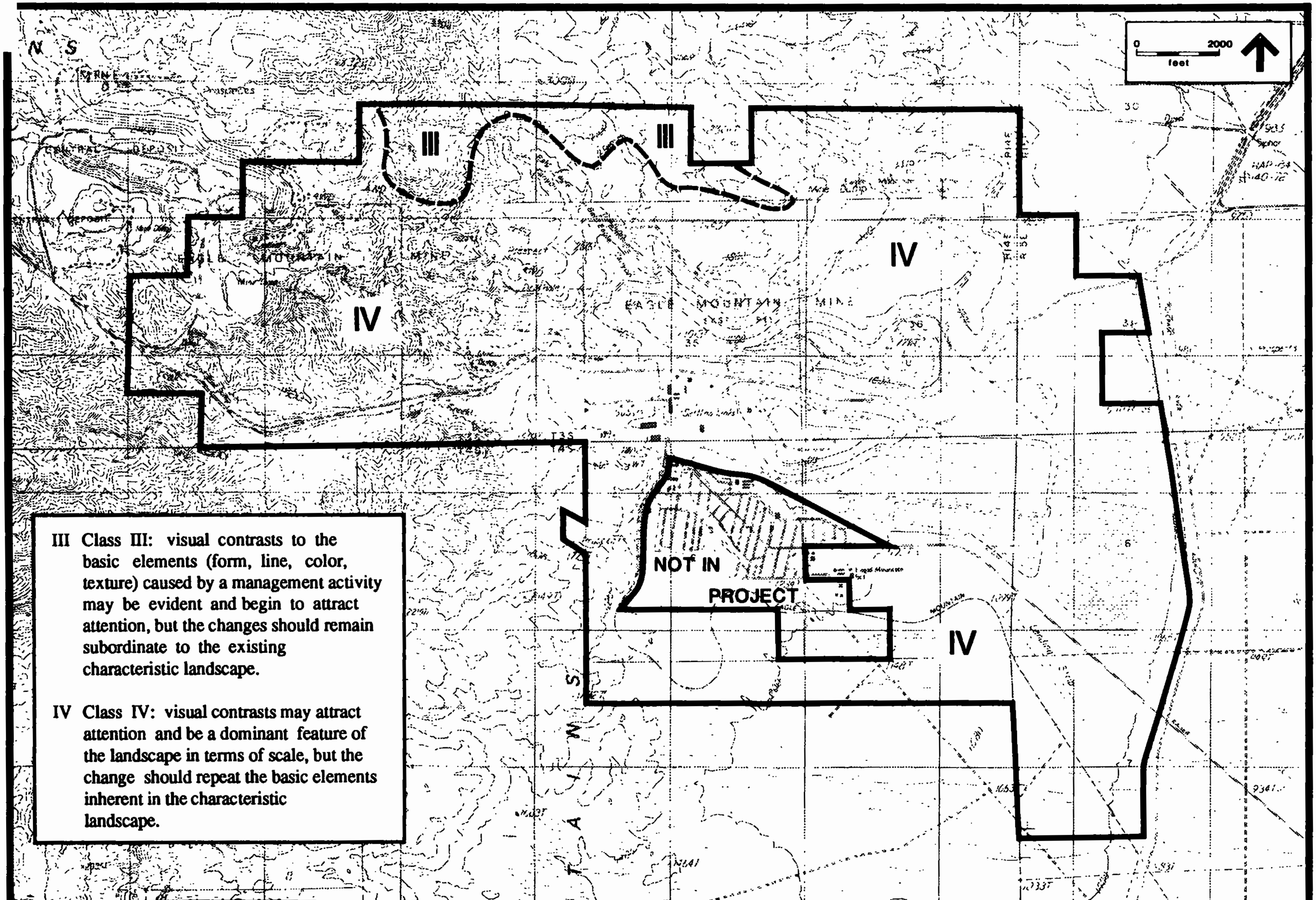


FIGURE 69. VISUAL RESOURCE MANAGEMENT CLASSES

RECON

vegetation. Although only the upper-elevation slopes are visible from most observation points, the mine area itself is a dominant visual feature in the immediate area with a high visual contrast with the undisturbed adjacent areas.

Visual Resource Management Class

The factors considered in determining the visual resource management (VRM) class for an area include the synthesis of scenic quality, sensitivity, and distance zones. Figure 69 shows the VRM classes within the project area. The scenic quality in the project area is medium to low (due to the extensive disturbance of the open pit mine area), the sensitivity level is moderate, and it lies mostly within background zones of KOPs. This results in the VRM Class IV designation for project activities. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed. It applies to areas such as this one, where the scenic quality has been significantly reduced due to extensive cultural modifications, and where there is potential for enhancement. This is an interim classification until higher VRM class objectives can be met. The objective of Class IV is to provide for activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of view attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

A small area of VRM Class III was also defined. This area is on the slopes of the Eagle Mountains that are estimated to be visible and within the foreground/middle ground zone of the Eagle Mountain KOP. The scenic quality is medium and the sensitivity level is moderate, resulting in a Class III designation. Within a Class III area, contrasts to the basic elements (form, line, color, texture) caused by a management activity may be evident and begin to attract attention in the characteristic landscape, but the changes should remain subordinate to the existing characteristic landscape.

f. Rights-of-Way and Land Exchange Properties

Railroad Right-of-Way

The existing railroad right-of-way and the proposed northern spur right-of-way both pass through the basins and bajadas landscape of the Chuckwalla Valley. From the Eagle Mountain townsite, the railroad continues south approximately 52 miles through similar landscapes of low visual quality. The railroad has been unused for five years, and although it is noticeable from some viewpoints, it is not a dominant feature in the landscape. The land within the proposed right-of-way consists of undisturbed flat desert terrain or areas previously used as tailing ponds for mine operations.

2. Recreation

a. California Desert Conservation Area

As described previously, the CDCA Plan developed by the BLM addresses a wide range of recreation opportunities based on the four multiple use classes: C (Controlled), L (Limited), M (Moderate), and I (Intensive). As discussed in the Land Use section, and shown in Figure 53, all four classes occur around the project area. As private land, the project area is not classified, but is surrounded by Class I land. The Eagle Mountains to the southwest are shown as Class C, and areas to the east and south are Class M. The BLM portion of the Coxcomb Mountains, abutting the south and east boundary of Joshua Tree National Monument northeast of the project site, are Class L. The multiple use recreation guidelines for Class C recommend nonmechanical types of recreational experience which generally involve low to very low user densities. Class L is suitable for recreation which generally involves low to moderate user densities.

There are no designated Areas of Critical Environmental Concern in the immediate vicinity of the landfill site itself. The two closest ones are Sidewinder Well south of Palen Dry Lake and the Chuckwalla Bench south of the Chuckwalla Mountains. An ACEC is defined as an area "where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes." The project rail right-of-way passes through the Chuckwalla Bench ACEC, which is known desert tortoise habitat, and the Salt Creek ACEC, which is critical habitat area for desert pupfish and Yuma clapper rail (see further discussion in biology section of this EIS/EIR). The rail and road rights-of-way south of the project site pass through lands designated Multiple Use Class M and through areas designated Class L (Limited Use) south of Interstate 10 and the Orocopia Mountains.

Hiking and backpacking are the recreational opportunities identified by the BLM for a large portion of the Eagle Mountains area southwest of the project (Figure 70). The area is open to motorized vehicles on existing routes, except where posted as closed, but the extreme ruggedness and diversity of the terrain limit access to four-wheel driving for pleasure along the major washes, such as Big Wash. Smaller canyons and enclosed interior valleys provide outstanding opportunities for solitude or a primitive and unconfined type of recreation, similar to the adjacent wilderness areas of Joshua Tree National Monument. The Sierra Club sponsors an annual organized hike in the Eagle Mountains.

The Coxcomb Mountains northeast of the project site (see Figure 70) offer similar opportunities on a more limited basis due to even more rugged terrain. Most recreational uses occur in the northern portions of these mountains where the terrain allows easier access.

Eagle Mountain Road Right-of-Way

The existing road right-of-way and the proposed right-of-way for the northern extension of this road also pass through the basins and bajadas landscape of the Chuckwalla Valley, an area of low visual quality. The existing Eagle Mountain Road runs from the I-10 interchange to the Metropolitan Water District pumping station, approximately seven miles. It is a paved, two-lane, 20-foot-wide roadway with very low traffic volumes, since it now serves only the pumping station. Although it is visible from I-10 looking north, it is not a dominant visual element in the landscape.

Eagle Mountain Road Extension

The Eagle Mountain Road Extension will begin just south of the MWD pumping station and will continue northeasterly at first and then northwesterly before heading northerly to an existing landfill on-site haul road. This partially existing dirt road is approximately 15-18 feet wide in most areas. The proposed road extension would run over flat desert terrain or areas previously used as tailing ponds.

Land Exchange Properties

Approximately 3,271 acres of BLM-owned lands (the "selected lands") within the project site boundaries will be exchanged for Kaiser-owned lands (the "offered lands") along the Eagle Mountain rail line right-of-way. The selected lands consist of portions of the Eagle Mountains immediately adjacent to the mine site, flat desert terrain east of the mine, and parcels within the Eagle Mountain townsite. The visual quality of these areas is generally low, due to the extensive nature of previous ground disturbances. The moderate visual quality of the non-disturbed portions of the Eagle Mountains is diminished by the proximity to the mine. The offered lands occur predominantly within the basins and bajadas landscape and are primarily non-disturbed areas of flat desert terrain, identified as desert tortoise habitat.

g. Windblown Debris and Dust

The vicinity of the project area is currently sparsely populated, with few sources of debris. Thus, the amount of windblown debris is small. Dust and wind conditions are discussed in the Air Quality issue section.

h. Night Lighting

The project area is currently inactive, with no mining activity occurring. As discussed in the Land Use issue section, the surrounding population level is low at the Eagle Mountains townsite. The only other major land use is the return-to-custody facility, which is lit at night. These land uses do not contribute significantly to night lighting.

BUREAU OF LAND MANAGEMENT
WILDERNESS STUDY AREAS

RECOMMENDED FOR NON-WILDERNESS DESIGNATION

RECOMMENDED FOR WILDERNESS DESIGNATION

JOSHUA TREE NATIONAL MONUMENT

DESIGNATED WILDERNESS AREAS

POTENTIAL WILDERNESS ADDITION

FIGURE 70.

WILDERNESS DESIGNATIONS

R-2100 7/90

South of Desert Center, the Chuckwalla Mountains (see Figure 70) have been rated high for recreation. The primary recreational activities include hunting, camping, prospecting, rock-hounding, four-wheel-drive access, nature study, and hiking. Most of these activities occur in the central portion where larger desert washes provide easier access.

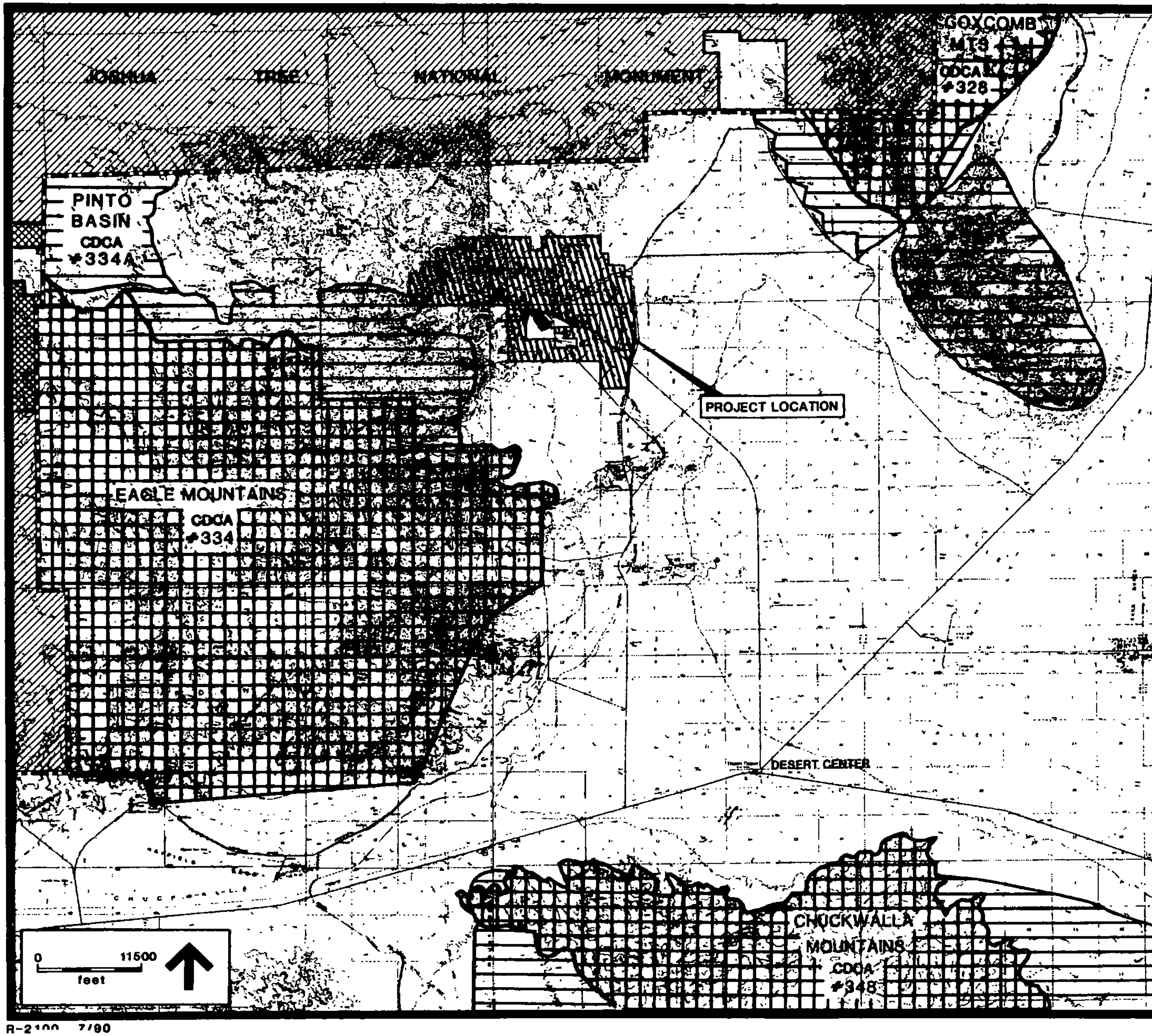
b. Joshua Tree National Monument

The most significant recreational land use element in the area is the Joshua Tree National Monument (JTNM) (Figure 71). A full range of recreation opportunities are provided, including camping, hiking, backpacking, sight-seeing, photography, wilderness use, and nature study. Visitor use is highest in the winter.

The main road from the northern headquarters at the Oasis Visitor Center to the Southern Cottonwood Visitor Center passes by the western extent of the Eagle Mountains. From this road, JTNM visitors enjoy a variety of sight-seeing opportunities, from the sweeping panoramic views of Pinto Basin to the changing vegetative communities of the high and low deserts. As the elevation drops approximately 2,000 feet, the Mojave Desert meets the lower Colorado Desert. Although the Eagle Mountains are highly visible from this road, the project area cannot be seen.

Leading from this main paved road is a dirt road, Old Dale Road, that provides four-wheel-drive passage to the north across Pinto Basin and up into the Pinto Mountains. This road provides spectacular views of the basin and surrounding mountains as well as serving as a "jumping-off" point for persons accessing wilderness areas on foot. Most of the JTNM away from road corridors is either designated wilderness area or areas which are being considered for wilderness designation, where no vehicular access is allowed. Visual range and line of sight are great, and because of this, trails are not delineated and marked, but there are common routes. Pinto Wash is a major backpacking route that parallels the north face of the Eagle Mountains. Its close proximity (between one and four miles) allows exceptional views of the mountains. Many hikers traverse this route east, and some continue on to the Coxcomb Mountains. The Coxcomb Mountains are so rugged that access into the mountains is limited to the north and central portions. Most use occurs in the northern half. More commonly, backpackers seek out the sheltered canyons at the base of the mountains. These are more easily accessed from Pinto Basin. Solitude and stillness are the primary amenities this route and other wilderness areas provide.

The Final EIS for The Monuments (BLM 1989) discusses alternatives for boundary extensions for Joshua Tree National Monument. Alternative A would include an upper bajada portion of the Pinto Basin (see Figure 54). Alternative C would include this area as well as a large portion of the Eagle Mountains north of Big Wash (see Figure 55). If approved by Congress, this alternative would transfer approximately 33,000 acres of public lands under BLM administration to the National Park Service.



BUREAU OF LAND MANAGEMENT
WILDERNESS STUDY AREAS

RECOMMENDED FOR NON-WILDERNESS DESIGNATION

RECOMMENDED FOR WILDERNESS DESIGNATION

JOSHUA TREE NATIONAL MONUMENT

DESIGNATED WILDERNESS AREAS

POTENTIAL WILDERNESS ADDITION

FIGURE 70.

WILDERNESS DESIGNATIONS

R-2100 7/90

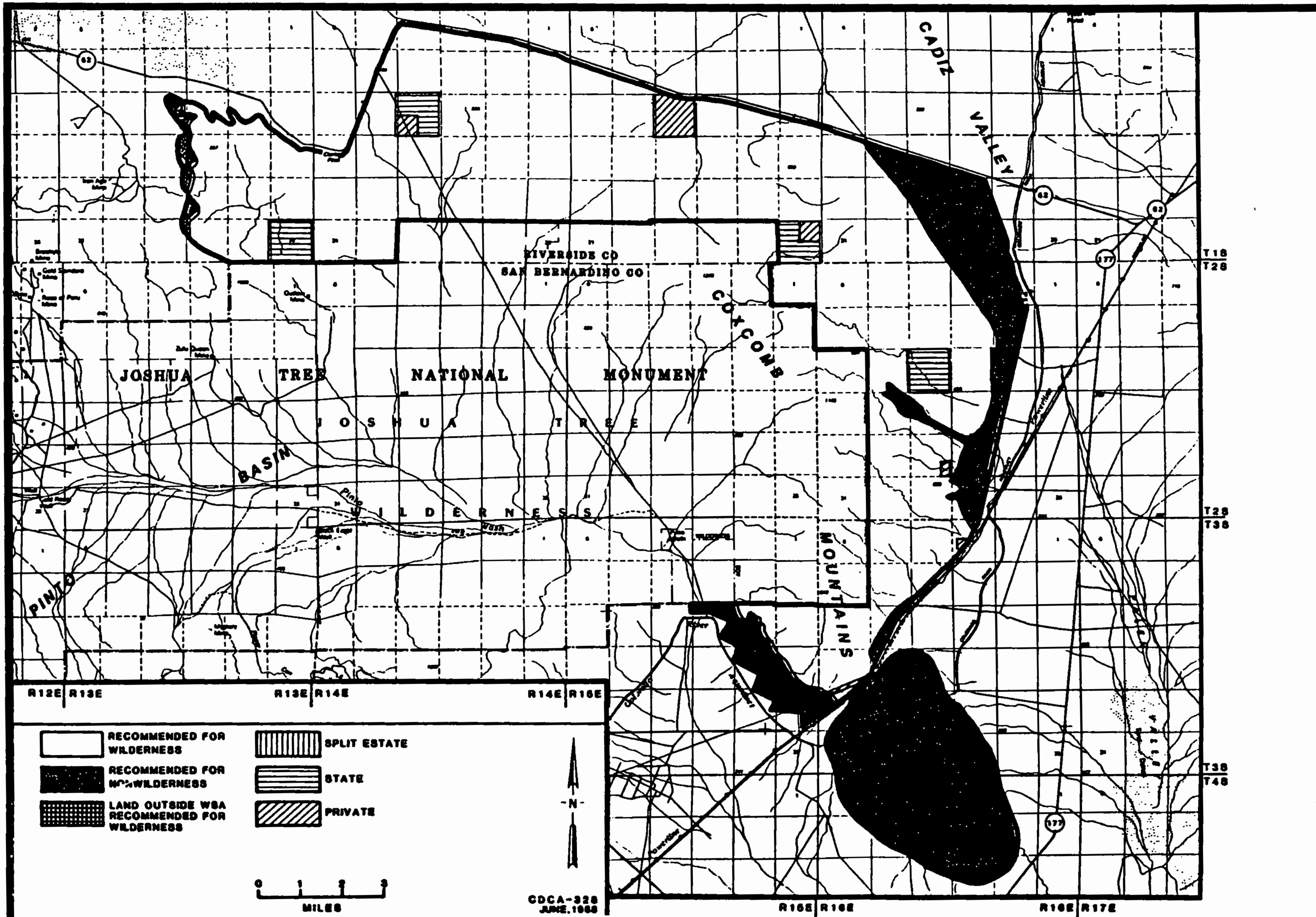


FIGURE 72. COXCOMB MOUNTAINS WILDERNESS STUDY AREA (CDCA-328)

SOURCE: CDCA, JUNE 1988

RECON

3. Wilderness

a. California Desert Conservation Area

In 1976, the Federal Land Policy and Management Act directed that lands under BLM jurisdiction be inventoried and evaluated for wilderness potential and that recommendations be made to Congress as to the suitability or nonsuitability of each Wilderness Study Area (WSA) for inclusion into the National Wilderness Preservation System. Portions of the Eagle, Coxcomb, and Chuckwalla mountains and Pinto Basin were identified as WSAs. Subsequent resource analysis for each of those WSAs led to suitable recommendations for parts of three of those WSAs: Eagle Mountains, Coxcomb Mountains, and Chuckwalla Mountains. Those areas recommended as suitable for wilderness designation are represented as Multiple Use Class C.

Areas designated as Class C have highly significant resource values including wilderness, wildlife, cultural, scenic, botanical, geologic, and others. To protect these significant resource values, any suitable areas not designated as wilderness by Congress will revert to Multiple Use Class L designation until a plan amendment makes a final classification.

Until Congress makes a final determination on wilderness designation, the BLM will manage all WSAs "so as not to impair the suitability of such areas for preservation as wilderness," as described in the Interim Management Policy guidelines.

The following is a brief description of the Wilderness Study Areas in the vicinity of the project area (Figures 70 and 72-75). Wilderness characteristics discussed are naturalness, solitude, primitive and unconfined recreation, and special features.

Coxcomb Mountains Wilderness Study Area (CDCA-328)

The Coxcomb Mountains WSA includes 70,993 acres of BLM lands, 2,286 acres of state lands, and private inholdings of 1,729 acres, totaling 75,008 acres. The WSA wraps around the northeast corner of Joshua Tree National Monument encompassing portions of the Pinto and Coxcomb mountains. Included within the borders of the study area is terrain that is as diverse and complex as any found within the California Desert. The major landforms within this WSA are the Coxcomb and Pinto mountains and the transition area between them. Vegetation is typical of the surrounding areas and representative of that found in both the Mojave and Colorado deserts. Transition areas, where the deserts overlap, display a mixture of vegetative types. Creosote bushes are dominant throughout the area except in and near the washes where smoke trees, desert willow, and palo verde are more noticeable. From a distance the mountain sides appear barren, but they actually support a large variety of shrubs and cacti. Desert bighorn sheep and burro deer inhabit the area.

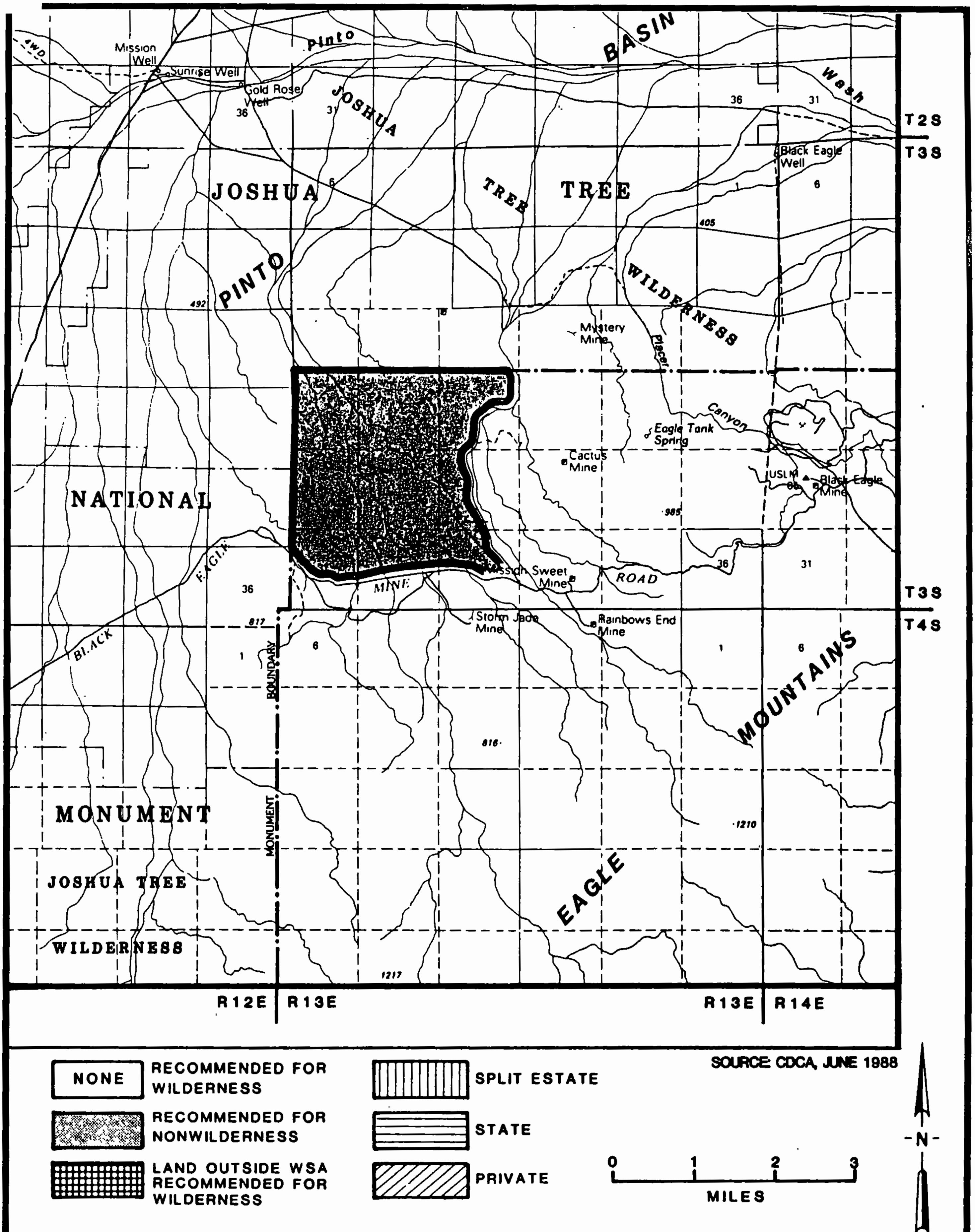


FIGURE 74. PINTO BASIN WILDERNESS STUDY AREA (CDCA-334A)

RECON

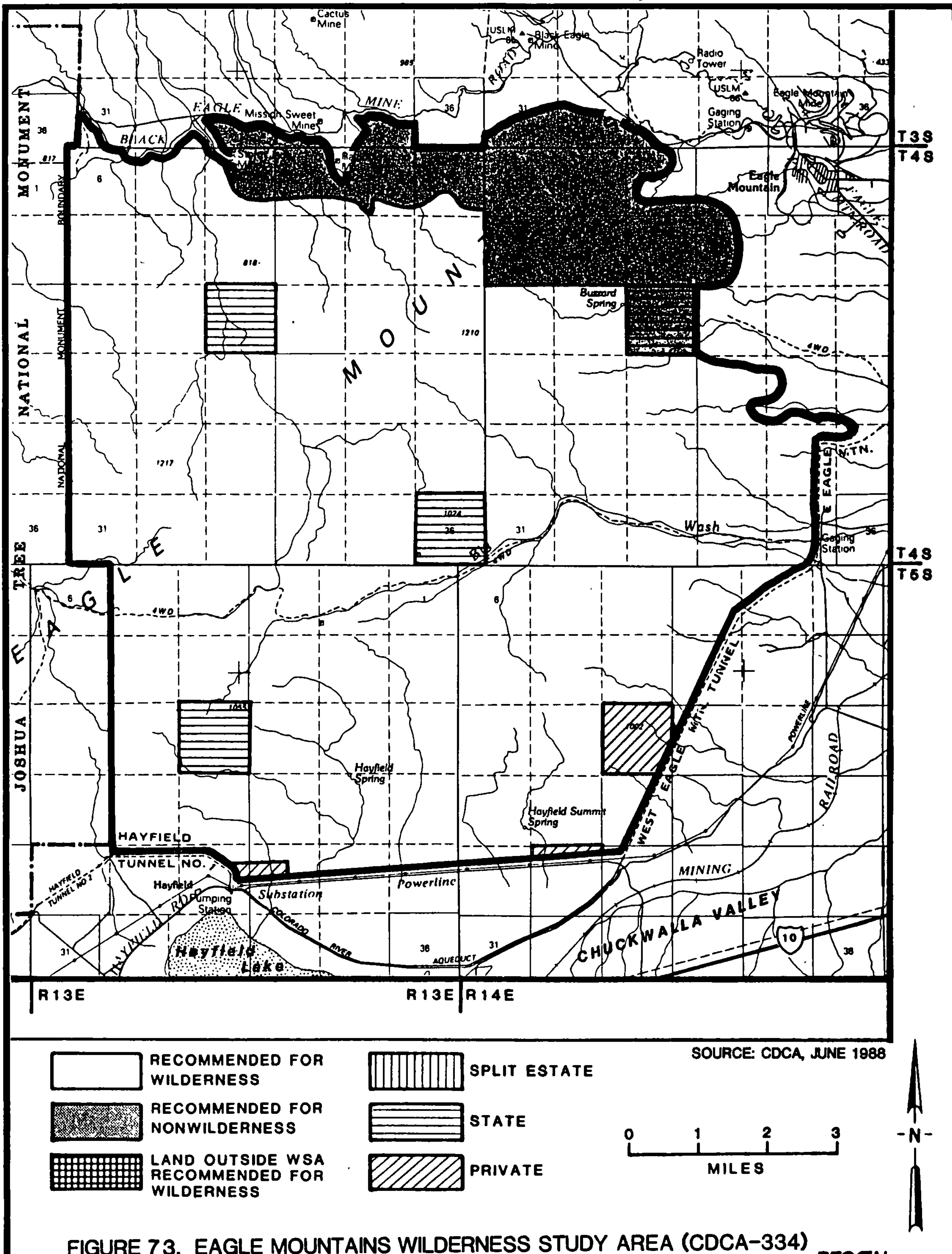


FIGURE 73. EAGLE MOUNTAINS WILDERNESS STUDY AREA (CDCA-334)

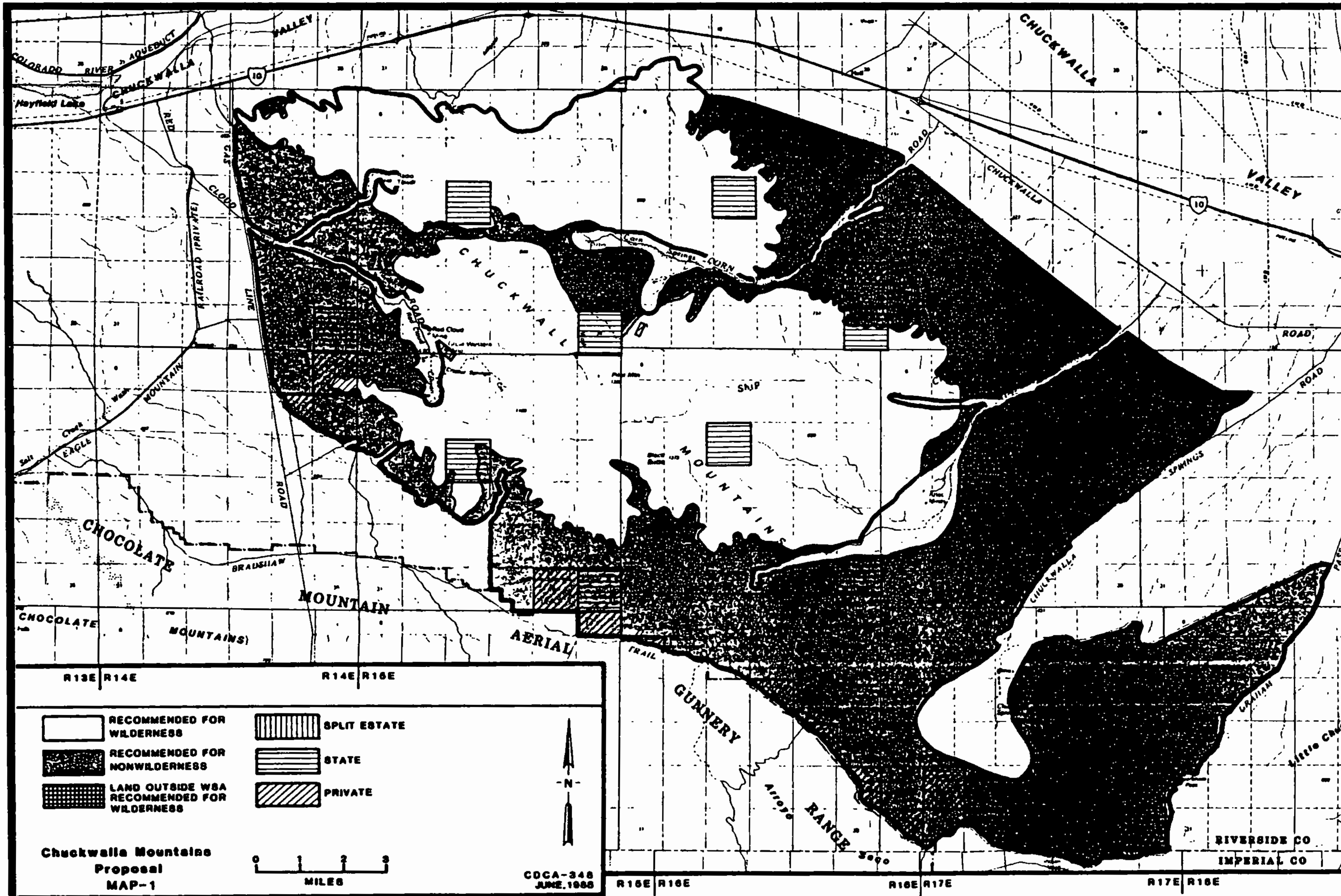
RECON

Naturalness. The forces of nature that created this WSA continue to be the suitable area's primary influence. Throughout most of the area, the landscape exhibits a primitive character. Rugged terrain insulates much of the suitable area from the effects of man-made features such as highways, mining activities and facilities associated with the Colorado River Aqueduct. In the nonsuitable portion of the WSA, man's influence is more apparent. A power line forms the suitable/nonsuitable boundary. Throughout the southern portion of the area, the scars of past mining activities has a detrimental effect of naturalness. Off-highway vehicle tracks can be found on the flat, eastern bajadas, also recommended nonsuitable.

Solitude. Opportunities for solitude vary due to the diversity of the landforms and variation in vegetative patterns resulting from the differences found in the Mojave and Colorado deserts. The relatively flat bajada and shallow washes along the nonsuitable eastern edge support primarily low growing shrubs which provide little physical shielding. In the larger sandy washes in the north, vegetation is taller and generally more dense. Here, tall creosote and smoke trees in addition to other types of vegetation help provide a feeling of seclusion and isolation. Within the jumbled rocky mountains and outcrops, the opportunities abound. The texture of the surface is such that even at relatively close range the sense of solitude and seclusion would prevail. Views into JTNM are available from most peaks, and the vastness and sense of isolation is overwhelming. Overall, the area offers outstanding opportunities for solitude.

Primitive and Unconfined Recreation. The ruggedness of the mountains lends itself to primitive recreation by virtually barring the use of vehicles. The area is pristine, and evidence of past use is limited. There is no feeling of confinement and the entire area supports outstanding opportunities for primitive and unconfined types of recreation.

Special Features. Wildlife in the Coxcomb and Pinto mountains reflects that found in and around JTNM. Desert bighorn sheep and burrow deer inhabit the area and approximately four square miles of desert tortoise habitat are located within the boundaries. The southwestern portion of the WSA supports at least one prairie falcon eyrie. Two "drinkers" have been developed in the area to supplement other water sources during the arid summer months. Outstanding scenic quality is a special feature of this WSA. Here, the elements of color, line, form, and texture create unrivaled natural masterpieces. The crest of the Coxcomb Mountains is composed of a series of irregularly spaced, sharp peaks which provide a dramatic silhouette against the lighter sky. The rock-covered slopes along the face of the range are scarred by deeply eroded canyons and shallow washes which drop and cut the bajada into intricate patterns. Random rock outcrops, reflecting miniaturized versions of the surrounding mountains, rise abruptly from the bajada like islands rising from a sea of sand. Layered landforms combine to create what appears from a distance to be a dark impenetrable surface. A closer look provides glimpses of gentle washes, interior valleys, and a maze of canyons which unlock the solid mass and provide access to the interior. Although varying only slightly more than 2,000 feet in



SOURCE: CDCA, JUNE 1988

FIGURE 75. CHUCKWALLA MOUNTAINS WILDERNESS STUDY AREA (CDCA-348)

RECON

important wildlife species. Included among the wildlife which inhabit this area are desert bighorn and burrow deer. The habitat within the study area is essential to the daily maintenance of these populations. The eastern edge of this area includes five square miles of crucial habitat for desert tortoise.

Pinto Basin Wilderness Study Area (CDCA-334A)

Northwest of the Eagle Mountains WSA, this area consists of 3,604 acres of BLM lands. No private lands are included within its boundaries. This WSA is roughly square in shape. The northern and western boundaries are formed by the boundary of JTNM. The southern boundary follows Black Eagle Mine Road. To the east, the boundary follows an unnamed jeep trail between Black Eagle Mine Road and the JTNM boundary. This WSA encompasses a portion of the bajada known as Pinto Basin. The area slopes gently, the relative flatness broken only by a few shallow washes. Vegetation consists of scattered creosote bushes. Elevation varies from 2,000 feet in the southeast to 1,750 feet in the northwest.

Naturalness. In only a few areas is man's work evident, and in every case, these man-made scars are related to mining activity. Primitive routes, adits, and trenches are located within the boundaries of this WSA. However, for the most part, this area is affected primarily by natural forces and man's imprint is substantially unnoticeable.

Solitude. The opportunities for solitude vary within the WSA. Sparse vegetation and the flat terrain provide miles of unrestricted views but offer little shielding to conceal users.

Primitive and Unconfined Recreation. The area's flat terrain precludes difficult and technical types of primitive or unconfined recreation. Because the area contains no interesting or unique features, infrequent hikers using this WSA simply pass through, on their way to destinations elsewhere within JTNM or the Eagle Mountains.

Special Features. This area has no special features.

Chuckwalla Mountains Wilderness Study Area (CDCA-348)

These mountains are characterized by colorful and rugged rock ridges, boulders, hills, and large interior washes. At the southern end is the broad expansive bajada, the Chuckwalla Bench. The majority of the roadless area is affected primarily by natural forces, with man's imprint substantially unnoticeable. The Corn Springs/Aztec Wells Road has been excluded. The Chuckwalla Mountains WSA includes 146,000 acres of BLM lands, 8,024 acres of state lands, and 5,196 acres of privately owned inholdings, totalling 159,220 acres. This broad study area includes the Chuckwalla Mountains, portions of the Chuckwalla Bench in the south, and Chuckwalla Valley in the northeast. As with most of the larger mountain masses within the CDCA, the Chuckwalla Mountains rise abruptly, as an island from the vast sea of sand and elevation between the highest and lowest points, the irregular shape, coarseness, and dark color, rising rapidly from a smooth desert floor, supports the impression of a much greater variation.

Eagle Mountains Wilderness Study Area (CDCA-334)

The Eagle Mountains WSA includes 58,462 acres of public land administered by the BLM, and 3,178 acres of state lands, totalling 61,640 acres. The major features of this WSA are the Eagle Mountains and Big Wash. Big Wash is the primary drainage for the eastern slope of this mountain range. The area is rugged and, except in the washes, sparsely vegetated. The topography of the area is diverse and extremely complex. Elevation varies from 4,000 feet in the northern mountain peaks, to 1,600 feet in the eastern end of Big Wash. Steep peaks, shear canyons, rugged rock outcrops, smooth bajadas, and large sheets of the desert-varnished rocks called desert pavement combine in constantly changing displays of desert scenery. The study area possesses unique vegetation as described in the Special Features section.

Naturalness. There are few intrusions into the WSA and the majority of the area appears to have been affected primarily by natural forces. Within the interior and in the Big Wash area, only a few past mining operations are visible and these have been obscured by the elements over time. These indistinct scars do not detract from the primitive character of the land. The WSA's many sandy washes are used by off-highway vehicles, but signs of use are eliminated by rainfall. JTNM to the west has acted as a barrier to eliminate random vehicle use.

Solitude. Opportunities for solitude can be found throughout the WSA. Canyons, boulder piles, interior valleys, and, in the washes, vegetation, provide an unlimited source of intimate spaces. Outside of these areas, a sense of spaciousness with unlimited vistas in all directions exists. The opportunities for solitude are magnified by the isolation afforded by the proximity of JTNM.

Primitive and Unconfined Recreation. Opportunities for primitive and unconfined types of recreation abound within this WSA, and in conjunction with the wilderness opportunities available in JTNM, the variety of recreational experiences to be had are exceptional. Picnicking, hiking, rockhounding, and upland game hunting are popular activities within this WSA.

Special Features. Three areas of cultural sensitivity have been identified within the suitable area. Two are located in the northern portion and the third in the central portion of the WSA. In the north, stoneworking tools and debris have been recorded. In the central area, a number of prehistoric sites have been located, the majority of which are petroglyph sites. This area is proposed to be nominated to the National Register of Historic Places. An average of five sites per square mile has been predicted in this area. One rare plant species has been reported near the southwest corner of the WSA. This species, Alverson's foxtail cactus, is a candidate for listing as threatened/endangered and is currently under review by the USFWS. The varied topography of this WSA and the presence of three intermittent springs, support a variety of and man-made intrusions, and the area has been left in a natural state. Outstanding opportunities for primitive recreation abound. The area is untrammeled. There are no restrictions which would confine users. In the nonsuitable area, opportunities for primitive and unconfined types of recreation are also present. However, in many cases, the imprints of man create constraints that impose a sense of confinement.

Special Features. Historically, the Chuckwalla Mountains have supported Native American populations, and they have left their marks throughout the study area. Petroglyphs, aboriginal rock rings, quarry sites, and other remains attest to the early presence of these people. One area of high sensitivity/significance is included within the suitable boundary.

There is a variety of sensitive plants and animals within the suitable areas. The following BLM sensitive plant species are found here: Alverson's foxtail cactus and California ditaxis. Glandular ditaxis, listed in the California Native Plant Society's *Inventory of Rare and Endangered Vascular Plants of California,* is also located in this area. In the nonsuitable area, one unusual plant assemblage can be found. This feature consists of several large specimens of Munz cholla, the largest cholla in the California Desert and known only from the Chuckwalla Bench and parts of the Chocolate Mountains.

The varied topography and relative abundance of water within this area support a diverse faunal assemblage. This area includes areas of permanent and seasonal range for desert bighorn sheep, a BLM sensitive species. The bighorn sheep herd in these mountains was estimated at 25 individuals in 1980. These mountains also contain a population of burro deer and at least one prairie falcon aerie. Two big game guzzlers are located within the WSA to provide water for bighorn sheep and deer. The lower mountain slopes contain populations of desert tortoise.

The alluvial fan located south of the Chuckwalla Mountains, in the nonsuitable area, is known as the Chuckwalla Bench. This area, well known for dense desert tortoise populations, contains outstanding habitat for a variety of birds, animals, and reptiles. Its quality and diversity were distinctive enough to merit its designation as an ACEC.

b. Joshua Tree National Monument

JTNM was established by proclamation August 10, 1936, to preserve a representative and scenic portion of the Mojave and Colorado deserts for the benefit and enjoyment of present and future generations. The Statement for Management, approved in 1978, establishes land management policies and objectives for the monument.

In 1976, Congress designated more than 467,000 acres of Joshua Tree National Monument as wilderness. Most of JTNM away from the road corridors is wilderness with special rules and regulations governing use (see Figure 70). Motorized vehicles are not allowed within the wilderness areas.

rock. Included within the walls of this rock fortress are an infinite variety of landforms, spatial features, textures, and colors. Steep-walled canyons, inland valleys, large and small washes, isolated rock outcrops, and vast expanses of desert pavement interact with each other and with the other resources and elements to form a constantly changing panorama. Elevation varies widely from the low-lying bajada at 800 feet elevation to the area's highest peak, Black Butte, reaching up to 4,450 feet.

The diverse topography of these areas support an equally diverse plant and wildlife community. Ocotillo, cholla, yucca, creosote, barrel cactus, and nolina are scattered throughout. Iron tree washes lace the surface and support many types of wildlife. Bighorn sheep, burro deer, desert tortoise, raptors, snakes, coyotes, and fox are just a few of the many creatures that make their home here.

Approximately 15 percent of the Chuckwalla Mountains WSA is overlapped by the Chuckwalla Bench ACEC. This area contains important habitat for desert tortoise, a federally listed threatened species. Also, within the northeastern cherry-stemmed area lies Corn Springs ACEC, designated in recognition of its outstanding cultural resources and recreation potential. Both these ACECs are designated in the CDCA Plan, but are farther than 15 miles away from the project area.

Naturalness. Prior to the 1960s, historic use of the Chuckwalla Mountains and the surrounding bajadas was generally restricted to mineral exploration and development. In the suitable areas, a few abandoned mines and access routes exist but these are gradually reverting back to a natural appearance. The area, in general, has more recently attracted recreationists interested in off-highway vehicle use. The mountains are rugged and, for the most part, preclude vehicular use, but the washes support off-highway vehicles of all types. Damage to vegetation in the washes is minimal and the visual impacts of this use is erased following each rain. Overall, the suitable area has maintained its natural condition. The nonsuitable area is more accessible and, therefore, man has had a greater influence on the land. A history of prospecting has resulted in trenches, adits, and primitive roadways scattered throughout the area. The cumulative impacts of these intrusions acts to reduce significantly the nonsuitable area's naturalness.

Solitude. Opportunities for solitude vary. In the suitable areas, the rugged landform varies considerably. These areas support a complex network of large and small washes, ridges, canyons, and inland valleys. Vegetation of all types and sizes reinforces the surface variation to provide seclusion. In most areas, visitors, even at relatively close range, would be shielded from each other.

Primitive and Unconfined Recreation. The same features that provide the background for solitude in the suitable area, tend to ensure outstanding opportunities for primitive recreation. The overall ruggedness of the interior Chuckwalla Mountains has precluded the use of vehicles

K. Utilities and Services

As noted throughout this document, all the major public services and utilities were developed at the town of Eagle Mountain by Kaiser to support the mine workers. Since the mine is now closed, most of the single-family residences are unoccupied, and the supporting commercial and institutional facilities are no longer in operation. Prior to the mine closure, approximately 3,700 persons lived at Eagle Mountain (Kaiser Steel Corporation 1978:6). In 1978 there were 416 permanent residences, 185 trailers, 450 dormitories, and supporting commercial facilities (Kaiser Steel Corporation 1978:6). As late as 1980, census data indicated that there were 579 dwelling units and a population of 1,859 at Eagle Mountain.

This infrastructure is still in place. The town of Eagle Mountain is occupied by Kaiser Steel Resources office facilities and the return-to-custody facility. Expansion of the RTCF was approved by the County of Riverside in May 1989 to allow a maximum of 500 residents. The facility currently houses 271 inmates. In June 1990 there were approximately 160 people living in 55 residential dwelling units at the town of Eagle Mountain.

From a public services standpoint, the affected environment would also include the surrounding communities of Desert Center and Lake Tamarisk, which are located southeast of the project site. The Lake Tamarisk development consists of about 70 privately owned single-family homes, two recreational lakes, a nine- hole golf course, a 150-space recreational vehicle park, and about 150 undeveloped lots owned by Kaiser Steel. Desert Center, at the junction of Interstate 10 and State Route 177, has a population of approximately 27 and has 13 single-family residences and several businesses. Commercial services in the area are found primarily in Desert Center. These services are discussed in detail below.

1. Water and Sewer

Prior to the early 1980s, well water was used by Kaiser Steel for domestic purposes at the town of Eagle Mountain. Since that time however, the State Department of Health Services determined that the aquifer contains fluoride levels which exceed allowable state drinking water standards. At Eagle Mountain, groundwater continues to be used for industrial and domestic uses, but all drinking water is provided by tanker truck or in bottles. Lake Tamarisk has a plant which treats the water for fluoride removal.

Sanitary sewer service is available at Eagle Mountain in sewage disposal ponds located just south of the town. This treatment facility is designed to discharge up to 180,000 gallons per day, although its permitted discharge by the Lower Colorado River RWQCB is less, 40,000 gallons per day. This facility served the residents associated with the Kaiser iron ore mining operation prior to the closure of the mine. Lake Tamarisk also has a small treatment facility. Sewage treatment at Desert Center is via septic systems.

The part of JTNM in proximity to the project site is designated as Natural Environment and Wilderness subzones. Lands within the Natural Environment Subzone (two percent of adjacent lands) are to be managed as follows: "The natural resources and natural processes remain largely unaltered by human activity except for approved developments essential for management, use, and appreciation. Developments are limited to park roads, picnic areas, backcountry parking areas, and three borrow pits." Lands within the Wilderness Subzone (98 percent of adjacent lands) also remain largely unaltered by human activity, except for 1.5 miles of dirt service road. No other development is allowed. Areas designated within the Wilderness Subzone are managed in accordance with the 1916 National Park Service Organic Act (16 U.S.C. 1 et seq.) and the 1964 Wilderness Act (16 U.S.C. 1131 et seq.).

Two large desert ecosystems primarily determined by elevation come together at Joshua Tree National Monument. The Colorado Desert (below 3,000' elevation) in the eastern half of JTNM is dominated by the abundant creosote bush. The higher, slightly cooler, Mojave Desert on the western half of JTNM is the habitat of the Joshua tree. Five fan palm oases also occur within JTNM. Rugged mountains of twisted rock and exposed granite monoliths rise abruptly from the adjacent alluvial fans and vast valley floor. Wilderness values are similar to those described for the BLM's adjacent Wilderness Study Areas. One of JTNM's primary hiking trails is located north of the Eagle Mountains along Pinto Wash and provides east-west access across Pinto Basin from the Old Dale Road corridor to the Coxcomb Mountains.

b. Natural Gas

Natural gas main lines exist along Kaiser Road, and larger gas pipelines are located along Interstate 10 and also run southwest/northeast from Desert Center. Natural gas service is provided to Eagle Mountain and the project area by Southern California Gas Company.

c. Telephone

Telephone service is provided by General Telephone and telephone lines exist for Eagle Mountain, Lake Tamarisk, and Desert Center.

4. Community Facilities

a. Schools

The three schools at the town of Eagle Mountain are within the Eagle Mountain Unified School District. Elementary and junior and senior high schools exist at Eagle Mountain. While the mining operation was under way, the district had approximately 1,000 students (Truitt, Desert Center Unified School District, 12/18/89). In 1989, there were approximately 90 students in grades K–8 using the buildings at the high school. High school students (30 students) are bused to Blythe. The elementary school and middle schools at Eagle Mountain are not currently being used.

b. Parks and Recreation

Community recreational opportunities exist at Lake Tamarisk (two lakes, recreation center, and a nine-hole golf course). The two lakes are used for recreational boating and fishing. At Eagle Mountain, indoor recreation facilities exist at the RTCF and will also be part of the proposed expansion of that facility.

c. Libraries

A Riverside County branch library exists at Lake Tamarisk and is staffed by one clerk half-time. The library is currently underutilized and number of volumes per capita far exceeds the County of Riverside standard (Auth, City of Riverside Library, 12/19/89).

d. Solid Waste Disposal

A Riverside County sanitary disposal site for solid waste exists west of Kaiser Road between Desert Center and Eagle Mountain and serves Eagle Mountain, Lake Tamarisk, and Desert Center.

2. Fire, Police, and Emergency Medical Services

The Kaiser Steel fire station existed at Eagle Mountain to provide service to the town and the Kaiser mining operation. The station is not currently manned, but will be renovated and manned (two persons) by the County of Riverside to provide service to the RTCF at Eagle Mountain. A Riverside County fire station (Station 49) exists at Lake Tamarisk. This station is regularly manned by two people and supported by a volunteer company (Shay, Riverside County Fire Department, 12/15/89). The next nearest fire engine (required for a "first alarm" assignment) would respond from Mecca or Blythe. Both engines are more than 30 minutes distant in response time.

The existing water system for fire protection at Eagle Mountain is currently considered inadequate by the fire department (Regis, Riverside County Fire Department, 5/31/90). The fire department presently has a "hold" on the occupancy of any additional dwelling units within the community of Eagle Mountain primarily due to the deficiencies of the water system. Those deficiencies are due to the insufficient flows and pressures from the hydrants and inadequate access to the hydrants. The water system that serves the employee housing for MRC is currently being improved. The water system that serves the RTCF is being improved as required for their expansion.

Police service is provided to the project site and surrounding area by the Riverside County Sheriff Department from the Indio station. Eagle Mountain is not routinely patrolled, and the response time is approximately 30 to 45 minutes (Doyle, Riverside County Sheriff, 8/23/89).

Ambulance service for the area is provided through the Riverside County fire station at Lake Tamarisk. Fire personnel with emergency medical technician (EMT) I training provide ambulance service to the area. Paramedic and critical emergency service requiring air support (helicopter) is provided from Indio or Riverside.

3. Utilities

a. Electricity

The project site and surrounding area in Riverside County is within the service territory of Southern California Edison (SCE). The electricity distribution system (substation and lines) for Eagle Mountain is intact. Major transmission lines exist along Interstate 10 and southeast of Eagle Mountain.

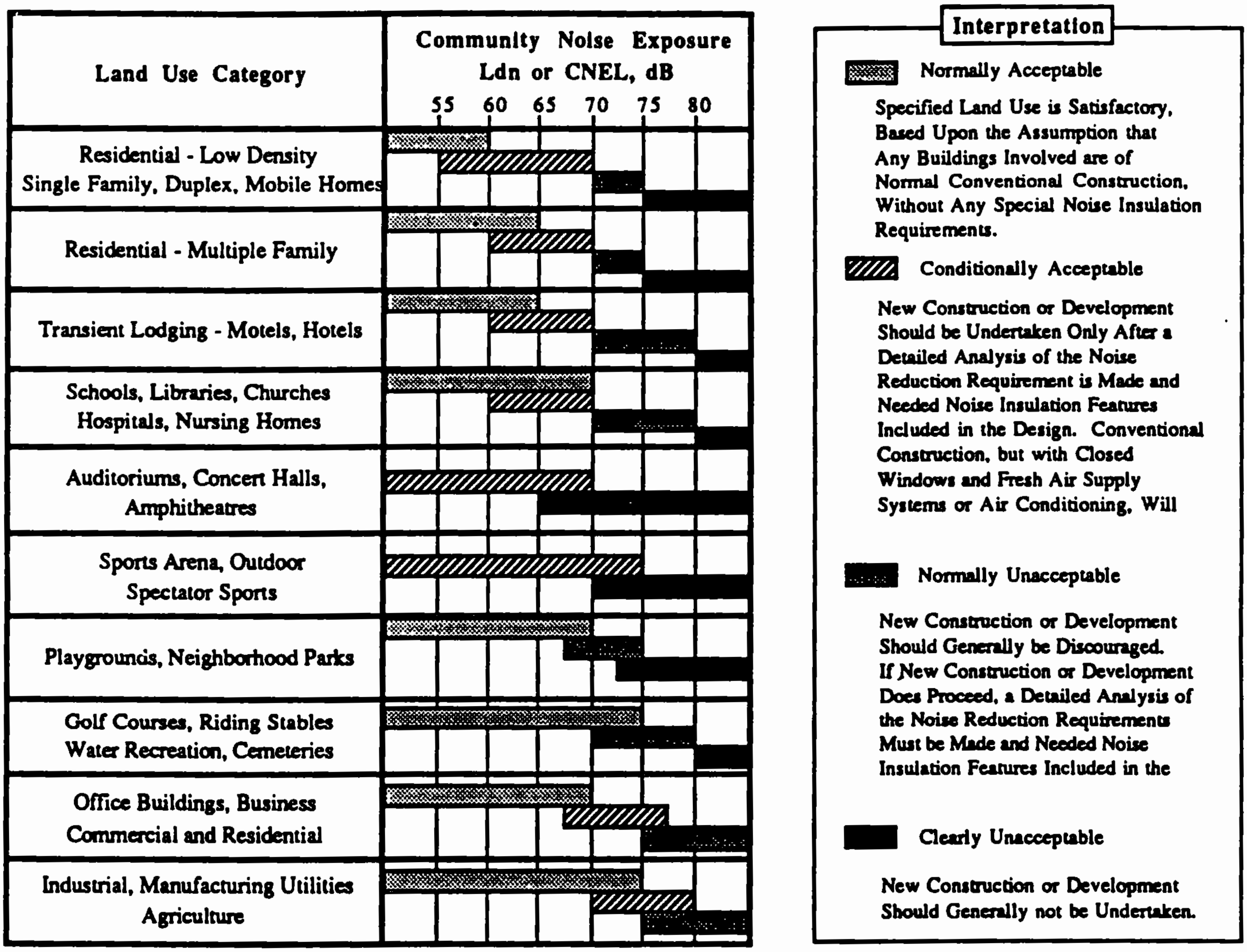


FIGURE 76. CALIFORNIA LAND USE COMPATIBILITY STUDIES

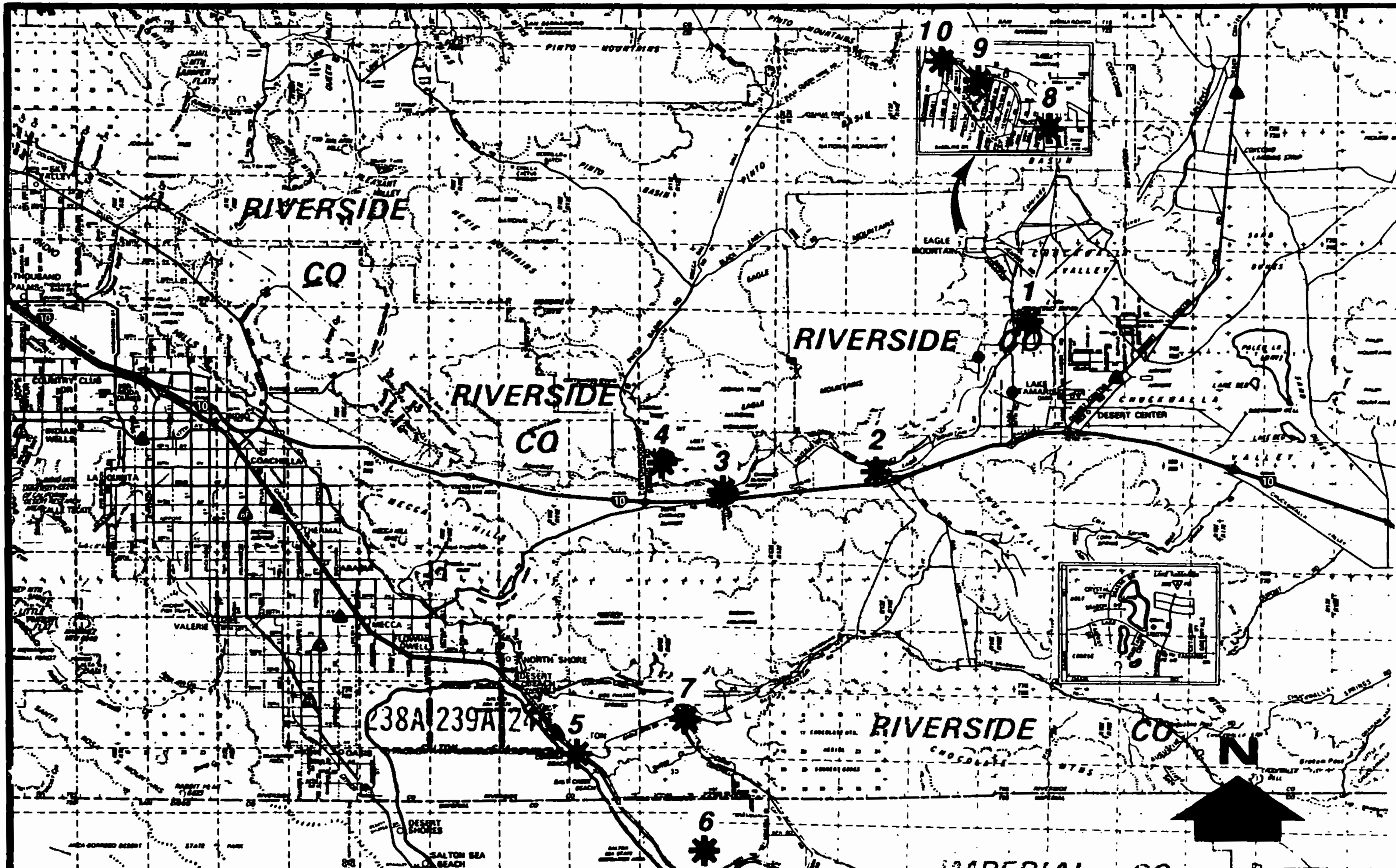
L. Noise

The following discussion is based on the noise technical study prepared for RECON by Mestre Greve Associates, Newport Beach, California, in February, 1990. The noise technical study is included with this report as Appendix H. The existing noise environment was determined through a comprehensive noise measurement survey and computer modeling effort. Existing noise levels were established along both the proposed rail routes to the project site and on roadways in the vicinity of the project site.

Several noise rating scales have been developed for describing the effects of noise on people and for evaluating the significance of those effects. The scale used in the noise technical study is the Community Noise Equivalent Level (CNEL). CNEL represents a time-weighted 24-hour average noise level based on the A-weighted decibel (dBA). "A" weighting equates noise to the frequency response of the human ear. Time weighting involves the penalization of noise during certain sensitive time periods. The CNEL scale penalizes the evening time period (7 P.M. to 10 P.M.) noise by 5 dBA and the nighttime period (10 P.M. to 7 A.M.) noise by 10 dBA. These time periods and penalties were selected to reflect people's increased sensitivity to noise during these time periods.

Riverside County does not have a noise ordinance that would apply to this project. However, the California Department of Health has established guidelines for assessing the compatibility of community noise environments and land uses in terms of CNEL. The guidelines rank noise and land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. These guidelines are summarized in Figure 76. Sixty and 65 dBA CNEL are the highest threshold noise levels considered normally acceptable for the most noise-sensitive land uses, single- and multi-family residences, respectively.

The State of California Department of Health Services model noise ordinance, contained in Table 16, establishes exterior noise standards. The ordinance is designed to protect residential areas from stationary noise sources on private properties. The model noise ordinance requirements cannot be applied to mobile noise sources, such as when traveling on public roadways. Control of the mobile noise sources on public roads is preempted by federal and state laws. The noise ordinance also does not apply to motor vehicles on private property.



SOURCE:MESTRE-GREVE ASSOCIATES 1990

FIGURE 77. NOISE MEASUREMENT LOCATIONS

RECON

TABLE 16
MODEL NOISE ORDINANCE STANDARDS

Maximum Time of Exposure	Noise Metric*	Noise Level Not to Be Exceeded 7 A.M.–10 P.M.	10 P.M.–7 A.M.
30 minutes/hour	L50	50 dBA	45 dBA
15 minutes/hour	L25	55 dBA	50 dBA
5 minutes/hour	L8.3	60 dBA	55 dBA
1 minute/hour	L1.7	65 dBA	60 dBA

*L(*x*) = noise level exceeded *x* percent of the time.

Measurements of ambient noise levels were taken at the approximate elevation of five feet above the ground at 10 different locations on December 13 and 14, 1989. The 10 locations are depicted in Figure 77. Measurements were conducted between 10 A.M. and 6 P.M. for a minimum duration of 15 minutes per site. Table 17 shows the results of the noise measurement survey. The quantities measured were the equivalent noise level (L_{eq}), the maximum noise level (L_{max}), and the percent noise levels (L%). Percent noise levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, L50 is the noise level exceeded 50 percent of the time, and L10 is the noise level exceeded 10 percent of the time. L90 represents the background noise level, L50 represents the average noise level, and L10 represents the dominant noise level. L_{max} represents the maximum noise level.

As shown in Table 17, existing ambient noise levels in the vicinity of the project site are generally low. These noise levels are a result of traffic noise on I-10 and arterial roadways, aircraft flyovers, and background noise. Sites 2 and 3 experienced moderate noise levels, but their proximity to roadways caused traffic noise to increase the otherwise low ambient noise levels at these sites.

a. Rail Routes

For site access, the project would utilize the 52-mile Eagle Mountain railroad, connecting the project site with the Southern Pacific main railway line at Ferrum Junction. The last train to use this rail segment occurred in 1986 and hence the ambient noise is extremely low.

Ninety-four miles of Southern Pacific rail line would connect Ferrum Junction to the Colton Yard/San Bernardino transfer station. This rail segment is of primary interest because all trains destined for the Eagle Mountain landfill would use these rail lines to access the site. From the Colton Yard/San Bernardino station to locales within San Bernardino, Riverside, and Los Angeles counties, several alternative rail routes could be taken.

South of I-10, the Southern Pacific railroad runs parallel to State Highway 111. Noise measurements conducted February, 1990, at Corvina Beach adjacent to the railroad recorded a peak noise level from a train operation of 73.7 dBA. In addition to this location, train noise measurements were made 50 feet from the Southern Pacific railroad at the Whitewater preserve between Indian Avenue and Gene Autry Trail on May 3, 1989. This location is approximately 70 miles west of the proposed Eagle Mountain landfill site (project site) and approximately 50 track miles northwest of the Corvina Beach station. The results of these noise recordings are shown in Table 18.

Existing CNEL were established by computer modeling the Southern Pacific railroad for existing operations using the Wyle Laboratories model for assessment of train noise (Wyle Laboratories 1973). Data on railroad operations were obtained from a Southern Pacific representative. The railroad line is used only for freight train operations, with 40 train pass-bys (with an average of 65 cars per train) comprising a typical day. Of the 40 train pass-bys, 5 occur during the evening hours and 4 occur during the nighttime hours. A speed of 50 miles per hour is considered typical for the train pass-bys.

These data were utilized in conjunction with the Wyle model to determine Southern Pacific train noise levels at various distances from the tracks. The results are shown in Table 19. These projections do not include influences of topography or barriers which might reduce the noise levels.

TABLE 19
EXISTING RAILROAD NOISE LEVELS

Distance (feet)	100	200	300	400	500	700	1,000	2,000	5,000
CNEL (dBA)	74	70	67	64	62	60	57	51	44

As depicted above, existing train pass-bys on the Southern Pacific rail line can reach high maximum noise levels (greater than 75 dBA) at a distance of 50 feet. Existing residential uses within roughly 350 feet of the railroad are currently exposed to noise levels greater than 65 dBA CNEL.

The Eagle Mountain railroad is currently not in use. Location 7 of the noise measurement survey (see Figure 77 and Table 17) provides existing noise levels adjacent to the rail line. Ambient noise levels at this location are below 40 decibels.

b. Roadways

The existing traffic noise levels in the vicinity of the project were established in terms of the CNEL index by modeling the roadways for the current traffic and speed characteristics. The

TABLE 17
RESULTS OF NOISE MEASUREMENT SURVEY

Site	Location	L_{eq}	L_{max}	L10	L50	L90
1	Off Eagle Mtn. Rd. south of site	45.9	47.6	46.6	45.6	45.1
2	Eagle Mtn. RR crosses I-10	62.7	77.3	66.1	57.1	46.8
3	Chiriaco Rd. north of I-10	58.3	68.8	62.1	56.1	51.1
4	Cottonwood Spring Rd. north of I-10	56.4	81.7	46.6	30.1	26.6
5	Corvina Beach	54.2	72.2	57.6	41.6	31.1
6	North of Bombay Beach	34.2	38.0	36.6	33.6	30.6
7	Eagle Mtn. RR at Coachella Canal Rd.	27.2	38.2	30.1	24.1	21.6
8	1/4 mile north of Eagle Mtn. Jr. & Sr. High School	58.5	82.9	45.6	35.1	32.6
9	Express Way at Yucca	47.9	66.1	40.6	32.6	30.6
10	Corner of Yucca & Palm	49.4	68.1	40.1	35.6	32.2

roadways that were modeled for existing conditions were the roadways near to the project site and those that might carry project-generated traffic.

The roadway noise levels were computed using the Federal Highway Administration's Highway Traffic Noise Prediction Model (FHWA 1978). The FHWA model takes into account traffic volume, vehicle mix, vehicle speed, and roadway geometry. Traffic data for Eagle Mountain Road and Kaiser Road, in the immediate vicinity of the project site, were derived from the DKS traffic study (Appendix D of this draft EIS/EIR). For these arterial roadways, the traffic mix of 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks was based on vehicle mix measurements for similar roadways in southern California. The computer-iterated distances to the 60, 65, and 70 CNEL contours for Eagle Mountain and Kaiser roads are provided in Table 20. Also shown in Table 20 are the I-10 distances to specified CNEL. The existing I-10 traffic volume of 12,200 vehicles per day and vehicle speed of 55 MPH were obtained from the DKS traffic study. The traffic mix for I-10 was obtained from Caltrans.

The roadway traffic noise projections shown above do not take into account any barriers, topography, or buildings that may reduce noise levels and, as such, are considered "worst case." Existing noise levels adjacent to Eagle Mountain Road and Kaiser Road are compatible with surrounding land uses. Noise emanating from Eagle Mountain and Kaiser roads does not exceed 60 dBA CNEL much beyond the edge of the roadway. I-10 is the major noise source in the area; the 70 dBA CNEL reaches a distance of 148 feet from the roadway edge, the 65 dBA CNEL reaches a distance of 319 feet from the roadway edge, and the 60 dBA CNEL reaches a distance of 687 feet from the roadway edge. Existing residences within 687 feet of I-10 may experience adverse noise levels if grade separations or other factors do not act to reduce the existing freeway noise.

TABLE 18
WHITEWATER PRESERVE TRAIN MEASUREMENT RESULTS
(50 feet from track)

Time	Direction	Maximum dBA	$L_{eq}(10)$ dBA	Duration (seconds)
12:06 p.m.	East	85	71	82
1:49 p.m.	East	95	79	133
2:42 p.m.	West	90	77	131
4:03 p.m.	East	89	73	48
5:01 p.m.	East	90	72	142
			(Peak 10 min.)	

TABLE 20
EXISTING ROADWAY NOISE LEVELS

Roadway	Distance to CNEL Contour (Feet) 70 CNEL	65 CNEL	60 CNEL
Eagle Mountain Road			
I-10 eastbound to I-10 westbound	RW	RW	RW
I-10 westbound to Ragsdale Road	RW	RW	RW
North of Ragsdale Road	RW	RW	RW
Kaiser Road			
I-10 westbound to Ragsdale Road	RW	20	43
Ragsdale Road to Lake Tamarisk Drive	RW	RW	14
North of Lake Tamarisk Drive	RW	RW	RW
Interstate 10			
Eagle Mountain Road to Kaiser Road	148	319	687

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

M. Cultural Resources

The prehistory of the Eagle Mountain area is largely unknown. Investigations conducted elsewhere in the California desert suggest that aboriginal populations came to the region during the cool, moist conditions which prevailed at the end of the Pleistocene era, circa 12,000 years ago (Moratto 1984). Exploiting the lake resources which existed at that time, these peoples left cultural remains which imply a variant of the Big Game Hunting Tradition, which is marked by the appearances of fluted projectile points across the middle of the continent. Apparently, this tradition was succeeded by one with a generalized hunting bias, the Western Pluvial Lakes Tradition (Bedwell 1970).

As conditions became dryer and warmer, the prehistoric inhabitants of the California desert adapted their life-styles accordingly. Seed processing became a part of their technology, followed by incipient agriculture. Hunting remained important, and cultural differences are reflected in artifact assemblages throughout what is termed the Late Cultural Sequence (Moratto 1984). This includes the Pinto period (7000–4000 before the present [B.P.]), the Gypsum period (4000–1500 B.P.), the Saratoga Springs period (1500–800 B.P.), and the Protohistoric period (800 B.P. until the Historic period) (Moratto 1984). Pottery appeared approximately 1,000 years ago. Available evidence supports the contention that the peoples of the California desert employed varying strategies to deal with the increasingly arid conditions. For the Protohistoric period, there is archaeological evidence that some desert peoples inhabited village locales on a year-round basis (Schaefer et al. 1987). Settlement systems were highly dependent on permanent sources of water and relied on food resources from the mountain foothills to the Colorado River. Temporary campsites are better documented in the archaeological literature (Schaefer 1985, 1988) and identification of the resource and settlement strategies employed is a current topic of archaeological research.

The first Europeans to enter the Colorado Desert encountered a stable population well adapted to the arid surroundings. At the time of contact with Europeans, five identifiable Native American groups had interest in the lower California desert. These groups, whose spheres of influence overlapped somewhat, were the Serrano in the northwest, the Chemehuevi in the northeast, and the Cahuilla to the south and west. Along the Colorado River, the Mojave and Halchidoma held sway.

European intrusion into the California desert begins with the travels of a solitary Spanish priest, Father Garces. Traveling without European companions and befriended by the Native Americans, he traveled from the junction of the Colorado and Gila rivers through the desert to the San Gorgonio Pass and then on to Mission San Gabriel. After his initial foray, he led Captain de Anza and a party of some 200 people along a similar route in 1775. Spanish interest in the California desert was limited to its value as a transportation and communication route, and this limited involvement continued under Mexican rule, which commenced in 1821 and ended in 1848 with the treaty of Guadelupe-Hidalgo. By the early 1850s, the search for mineral wealth and the desire to exploit the then largely unused supply of water in the Colorado River led to increased travel in the region, but settlement was still thin and widely scattered, concentrated as always around reliable water supplies.

The unintended diversion of the Colorado River resulted in filling the Salton Sea basin between 1905–1915, creating a large freshwater lake in the desert. Water exploitation schemes allowed a substantial agricultural expansion, and the valleys surrounding the California desert became centers of agricultural production. With no natural exit, evaporation and influx of leached salts from adjacent farmlands have led to increased salinity, causing the brackish conditions which exist in the Salton Sea today.

Three major undertakings affected the region during the 1930s and 1940s. The first of these, the Los Angeles Aqueduct, resulted in the temporary housing of several thousand workers in the area adjacent to Hayfield Spring. Remnants of their camps are still extant. The second, the California-Arizona Maneuver Area, developed as a desert warfare training center during World War II, is also still recognizable. Lastly came the development of the iron deposits in the Eagle Mountains and the building of the Eagle Mountain rail line.

There are two potential Native American issues. The first is that the Eagle Mountains may have been a traditional location for Native American tribes such as the Mojave, Chemehuevi, and Cahuilla to hunt mountain sheep and deer. The second is that the Eagle Mountains may have sacred or special historical significance to Native Americans. Dr. Lowell J. Bean was retained to develop an accurate and comprehensive assessment of these issues. He and his staff contacted eight Indian reservations whose tribal traditional territory included the Eagle Mountains and Lower Colorado Desert. They described the project to interested members, and arranged a visit to the mine area. Five of the reservations expressed initial interest in the visit, but only three actually participated: representing the Chemehuevi, Mojave, and Cahuilla tribes. No special significance was attached to the Eagle Mountains by any of Dr. Bean's respondents. His report, included as Attachment 3 of Appendix I, discusses this lack of significance of the Eagle Mountains to the present-day Native Americans and addresses the Native American's feelings concerning the effects of the project on their ancestral lands.

1. Eagle Mountain Iron Mine Including BLM Exchange Lands

The Eagle Mountain Mine property (the Specific Plan Area) was surveyed by a team of archaeologists between October 30 and November 15, 1989, and in February and March, 1991. The survey team examined undisturbed areas within the project boundaries, attempting to identify any historic or prehistoric cultural material. The Eagle Mountain Mine area has been badly disturbed as a result of mining activities. The disturbance is so pervasive that any cultural resources which may have existed on this portion of the property have been either carried away with ore or covered by tailings piles, which in some instances are hundreds of feet thick. No cultural resources were discovered either within the Eagle Mountain Mine area or within the BLM exchange lands area.

2. Road and Rail Ways

The terrain within the railroad improvement areas is essentially level. Original construction of the roadbeds entailed scraping away the natural soil for at least 20 meters on either side of the edge of the rail line.

Only one locus of cultural activity was located. This area has been recorded with the regional information clearinghouse at the University of California, Riverside, and assigned California trinomial identifier Riv-3798. One additional previously recorded site, Riv-3216, was not relocated within the survey boundaries.

3. Kaiser Exchange Lands

The parcels of land along the rail right-of-way which are proposed to be transferred to BLM jurisdiction, are, with the exception of nine isolated artifacts, devoid of evidence of prehistoric activity. Three of the nine isolates are individual flakes found in the surveyed portion of Sec. 21, T. 6 S., R. 14 E., about three miles south of Interstate 10. Four isolated flakes were found within Sec. 8, T. 6 S., R. 14 E.; Sec. 13, T. 7 S., R. 13 E.; Sec. 22, T. 13 S., R. 11 E.; and Sec. 33, T. 6 S., R. 14 E. A single flake was found in Sec. 20, T. 8 S., R. 11 E. The remaining isolated artifact is a single sherd of Native American pottery, in a wash descending from Difficult Canyon (Sec. 27, T. 5 S., R. 14 E.). These isolated artifacts have been recorded with the clearinghouse at the Archaeological Research Unit, University of California Riverside. Section 27 also contains a trash scatter of possible pre-1940 origin. It is located some 30 meters northeast of the site where the sherd was found, on the margin of the same wash. Three bottle fragments of purple glass were found in Section 27 just south of the railroad. No other cultural materials other than obviously modern litter were located on any of the other exchange parcels.

N. Paleontology

The following discussion is a summary of the Eagle Mountain landfill paleontologic assessment conducted by the San Bernardino County Museum in December 1989 and located in Appendix J of this EIS/EIR. It includes a review of pertinent published and unpublished geologic and paleontologic literature, institutional site records checks, and field survey of those areas defined by the literature and records searches as having the potential to contain paleontologically sensitive sediments which could be affected by project development.

The area under assessment consists of two distinct geologic and geographic areas: the area north of I-10 and the area south of I-10.

1. North of Interstate 10

The project in this area includes the proposed disposal site at the Eagle Mountain Mine, the BLM lands to be exchanged with Kaiser Steel Resources, Inc. lands, the truck access by Eagle Mountain Road and its proposed extension, and approximately 12 miles of the Eagle Mountain rail line, all of which lie north of I-10 as it runs east-west between Chiriaco Summit and Desert Center. The following rock types occur at the site and along the rights-of-way.

<u>Gneissic rocks</u> are of high metamorphic grade and have been subject to severe deformation. These rocks may range in age from Proterozoic to early Mesozoic. However, recrystallization involved in their formation precludes preservation of fossils.

<u>Granitic rocks</u> are late Mesozoic in age and because of their intrusive nature are in part responsible for the deformation of the metamorphic rocks listed above. Their mode of emplacement and crystallization precludes preservation of fossils.

<u>Volcanic rocks</u> north of I-10 may be early to middle Miocene in age, circa 20 million years, assuming that they are from the same volcanic event that took place in the Orocopia Mountains. The volcanic rock is not associated with sediments or volcaniclastic debris flows, and consequently, they have a low potential to contain vertebrate fossils. The proposed rights-of-way will not cross the Tertiary volcanic rocks.

<u>Pleistocene alluvium</u> occurs as dissected fanglomerates and terraces within the project area. These are expected to contain coarse, angular rocks near their source and grade into finer sediments away from their source. The potential for vertebrate fossils in these sediments would increase away from the source as sediment clast size became finer and as sediments became stable and developed soil horizons.

Recent alluvium is located in valleys and in wash bottoms between outcrops of the above rock types. These recent, active sediments have low potential to produce paleontologic resources.

2. South of Interstate 10

The Eagle Mountain rail line south of I-10 runs from the Chuckwalla Valley across the Chuckwalla Bench to Chuckwalla Summit. It then parallels Salt Creek as it runs south of the Orocopia Mountains and north of the Chocolate Mountains. The Coachella branch of the All American Canal is near the elevation of the high shoreline of ancient Lake Cahuilla. Near this point, the Eagle Mountain rail line is north of Salt Creek and runs southwesterly to its terminus at Ferrum Junction, on Highway 111 on the east side of the Salton Sea. The Eagle Mountain rail line and Kaiser Steel Resources lands to be exchanged to BLM lie within the following geologic sections south of I-10 to Ferrum Junction on Highway 111.

Gneissic rocks of high metamorphic grade in the eastern Orocopia Mountains, western Chuckwalla Mountains, and western Chocolate Mountains may be older than 500 million years. The high grade of crystallization and severe deformation precludes preservation of fossils.

Orocopia Schist in the south and western Orocopia Mountains is now considered to be Mesozoic in age. The Orocopia Schist figures prominently in discussions of amount of offset along the San Andreas fault. The high degree of crystallization and deformation precludes preservation of fossils.

Granitic rocks span a period of time that includes the late Mesozoic. Their mode of emplacement and crystallization precludes preservation of vertebrate fossils.

The Maniobra Formation of Eocene age contains an important assemblage of invertebrate fossils which includes four gastropods and two pelecypods. The Maniobra Formation plays an important part in discussions of offset along the San Andreas fault. The Maniobra Formation has the potential to contain vertebrate fossils. The Eagle Mountain rail line right-of-way and access roads will not come into contact with the Maniobra Formation.

The Diligencia Formation is now considered to include the Late Arikareean land mammal age of the early Miocene. The vertebrate fossils provide age control for the continental sediments of the Diligencia Formation which figures prominently in the discussions of offset distances and rates along the San Andreas fault. The fossil localities are approximately two-thirds of a mile distant from the Eagle Mountain rail line right-of-way and the formation itself is not encountered by the railroad right-of-way.

Tertiary volcanics interfinger the early Miocene Diligencia Formation and are mapped as being in the upper Diligencia or overlying the Diligencia Formation within the Orocopia Mountains. To the southeast, in the Chocolate Mountains, tertiary volcanics are mapped as sitting within or on top of Pliocene or Pleistocene fluviatile sediments on the northeast side of the San Andreas fault. The volcanic rocks may provide datable horizons within the sedimentary units between early Miocene and late Pliocene times. These volcanic units south of I-10 are generally associated with sedimentary units which have potential to contain vertebrate fossils. The Eagle Mountain rail line will not directly cross Tertiary volcanic rocks but is cut into sedimentary units which may interfinger with these volcanic sediments.

Pleistocene old alluvium. Fluviatile sediments include coarse fanglomerates and fine-grained fluviatile sediments which occur along the Eagle Mountain rail line right-of-way. These fluviatile sediments are coarse near their source and grade to finer sediments with soil horizons near the valley centers. In the northern Chocolate Mountains and in the western Chuckwalla Mountains, geologic mapping has distinguished older Pleistocene alluvial deposits from Pleistocene alluvium. Field relationships suggest that the latter is younger than the former. The field assessment determined that the Eagle Mountain rail line runs through moderately coarse to fine fluviatile sediments with several very well developed red loamy soil horizons. These are probably equivalent in age and may be distal depositional equivalents to the Pleistocene old alluvium mapped to the south and east. The Pleistocene old alluvium along the railroad right-of-way is distinguished from younger Pleistocene alluvium by deep weathering and because it may be somewhat deformed and may contain fault offsets that are not seen in the younger Pleistocene alluvium. Fine-grained portions of the Pleistocene old alluvium and the soil horizons have potential to contain paleontologic resources. Although no vertebrate fossils were located during the field survey, soil horizons have been shown to be relatively fossiliferous compared to coarse fluviatile deposits. The potential for paleontologic resources was reinforced during the field assessment when calichified casts of roots were located in the red soil horizons. The Pleistocene old alluvium along the Eagle Mountain rail line has potential to produce nonrenewable paleontologic resources. These resources may be impacted by excavation related to railroad rehabilitation and maintenance.

Pleistocene alluvium. Pleistocene fanglomerates and fluviatile sediments are mapped as occurring along the Eagle Mountain rail line right-of-way. These sediments may sit unconformably upon the Pleistocene old alluvium. Along the railroad, these sediments are very coarse and consequently have a low potential to contain nonrenewable paleontologic resources.

Pleistocene lacustrine sediments and interbedded fluviatile deposits are found above the high shoreline of Lake Cahuilla westward to the current shoreline of the Salton Sea. These in part are covered by a thin veneer of sediments from Holocene Lake Cahuilla and deltaic sediments from the Colorado River. However, downcutting wave action of Lake Cahuilla has exposed the Pleistocene lacustrine sediments over a broad area. The older sediments show deformation near the trace of the San Andreas fault. North of Bombay Beach at Salt Springs, these older lake sediments are nearly vertical and contain the Bishop Tuff, dated at 740,000 B.P. Lacustrine sediments of the Borrego Formation, named from deposits on the west side of the Salton Sea, may be correlative with these older Quaternary lake sediments. These older Pleistocene lake sediments are flat-lying or deformed, depending on their proximity to the San Andreas fault. Therefore, a broad range of time may be represented by these vertical sediments near the fault branches and those flat-lying sediments that are relatively undeformed. Their ages may range from middle Pleistocene at Bombay Beach, where the Bishop Tuff is exposed, to less than 35,000 B.P. North of Wister, the flat- lying sediments contain an articulated limb of a Pleistocene horse. Review of the Regional Paleontologic Locality Inventory at the San Bernardino County Museum identified many resource localities in the vicinity of the Eagle Mountain rail line where sediments are exposed west of the Coachella Canal to the margin of the Salton Sea (see Appendix J:15-16).

The field survey along the Eagle Mountain rail line reinforces the fossiliferous nature of the sediments between the Coachella Canal and Highway 111. See Appendix J, pages 16-17, for locations.

Pleistocene lacustrine sediments along the Eagle Mountain rail line west of the Coachella Canal and the terminus of the railroad at Ferrum Junction have potential to contain nonrenewable paleontologic resources.

Recent alluvial sediments occur on slopes covering the above-mentioned areas as well as in active washes located centrally in valleys. These recently active sediments have low potential to contain paleontologic resources.

Sedimentary rocks with high potential to contain nonrenewable paleontologic resources occur at the I-10 junction with Eagle Mountain Road and south of I-10 in several sedimentary units along the Eagle Mountain rail line.

O. Energy Consumption/Generation

1. Fossil Fuels

Consumption of fossil fuels during solid waste disposal activities results from the following:

a. Refuse collection.

b. Transport to intermediate handling/processing facilities via direct haul in refuse collection vehicles and the ultimate disposal site by truck or rail.

c. Refuse processing and transfer.

d. Disposal operations at the landfill (refuse compaction, soil cover placement, and grading).

The proposed Eagle Mountain landfill will receive up to 16,000 tpd by rail and up to 4,000 tpd by truck of refuse from an area that may include portions of Los Angeles, Orange, San Bernardino, and Riverside counties as well as other wastesheds. Because there are no current published estimates of the fuel consumption associated with refuse transport and disposal activities in these areas, the following assumptions were made by SCS Engineers forming the basis for this draft EIS/EIR energy consumption/generation analysis:

a. Fuel consumption on collection routes, such as from individual residential, commercial, and industrial accounts, will be the same regardless of whether the wastes are landfilled locally or at a remote desert site. Therefore, no attempt has been made to quantify fuel use associated with existing refuse collection activities.

b. In the above wasteshed area, approximately 85 percent of the collected wastes are hauled directly to local landfill sites in refuse packer trucks (those vehicle used for trash collection which hydraulically compact the refuse as it is picked up). The remaining wastes are first processed through transfer stations and then hauled to landfills in truck/trailer rigs.

c. Direct haul in packer trucks is economical at a one-way distance of 15 miles or less from the collection route to the landfill.

d. The typical haul distance for packer trucks from a collection route to a transfer station is 10 miles one way.

e. The typical haul distance for transfer vehicles to existing landfills is 40 miles one way.

f. The average capacity of the major municipal landfills in the Los Angeles area is 5,000 tpd. To accommodate 20,000 tpd refuse input, four such sites would be required. This assumption has been used to estimate landfill equipment requirements.

g. Fuel use associated with support vehicles and smaller landfill or transfer station equipment is negligible.

A summary of the above assumptions and the types of equipment needed for transport, transfer, and landfill disposal of 16,000 tpd by rail and 4,000 tpd by truck of refuse to four 5,000 tpd capacity landfill sites is shown in Table 21. Corresponding estimates of fuel consumption for these activities are shown in Tables 22 and 23. Tables 22 and 23 also contain information on equivalent energy consumption in terms of million British thermal units (MMBtu). This information is presented for comparison with the energy consumption/production associated with the Eagle Mountain project.

Based on these assumptions and manufacturers' information on fuel consumption, it is estimated that the transport, processing, and disposal of 16,000 tpd by rail and 4,000 tpd by truck of refuse to four 5,000 tpd-capacity landfill sites would consume the following quantities of diesel fuel:

Refuse transport	11,100 gallons
Refuse handling and disposal	5,300 gallons
Total	16,400 gallons

This total corresponds to 0.82 gallon of fuel consumed per ton of refuse disposed.

2. Utilities Serving the Project Area

a. Electricity

The project site and surrounding area in Riverside County is within the service territory of Southern California Edison. The electricity distribution system (substation and lines) for Eagle Mountain is intact. Major transmission lines exist along Interstate 10 and southeast of Eagle Mountain. A residential unit can be expected to consume approximately 600 kilowatts per month according to SCE (1986).

b. Natural Gas

Natural gas main lines exist along Kaiser Road, and larger gas pipelines are located along Interstate 10 and also run southwest/northeast from Desert Center. Natural gas service is provided to Eagle Mountain and the project area by Southern California Gas Company. A residential unit can be expected to consume approximately 45 therms per month (SCE 1986).

TABLE 21
SUMMARY OF VEHICLES AND EQUIPMENT REQUIRED FOR TRANSPORT AND DISPOSAL OF 20,000 TPD OF REFUSE (EXISTING CONDITIONS)

Transportation

- 20,000 tpd of refuse generated and transported to four 5,000-tpd-capacity landfill sites.

- 85 percent of refuse generated (17,000 tpd) hauled directly to landfill in 8-ton-capacity packer trucks. Round trip haul distance is 30 miles.

- 15 percent of refuse generated (3,000 tpd) hauled in 8-ton-capacity packer trucks to transfer station. Round trip haul distance is 20 miles.

- 3,000 tpd of refuse transported to landfill sites in 22-ton-capacity transfer/trailer rigs. Round trip haul distance is 80 miles.

Transfer Operations

- Equipment for 3,000-tpd equivalent transfer station includes three 200-horsepower (hp) rubber-tired loaders. Refuse dumped directly into open-top trailers (i.e., no compaction equipment). Equipment operates 10 hours per day.

Landfill Disposal

- Landfill equipment for 5,000-tpd site (operating 10 hours per day):

  - 335-hp crawler tractors: 4
  - 650-hp off-highway scrapers: 2
  - 275-hp motor graders: 2
  - 310-hp refuse compactors: 2
  - 350-hp water truck: 1
  - 200-hp utility truck: 1

TABLE 22
FUEL CONSUMPTION FROM TRANSPORTATION OF WASTES TO EXISTING FACILITIES

Project Phase	Vehicle Type	No. of Vehicles	Miles/day per Vehicle	Average Speed (MPH)	Diesel Fuel Use Miles/gal	Diesel Fuel Use Gal/day	Equivalent Energy Consumption (MMBtu/day)
Refuse delivery to landfill	Refuse packer*	1,065	60	25	8.0	7,988	1,030
Refuse delivery to transfer station	Refuse packer§	188	40	25	8.0	940	121
Transfer station	Transfer truck/trailer#	45	240	45	5.0	2,160	279
TOTAL						11,088	1,430
Total Fuel Consumption, gallons/ton refuse						0.55	
Total Energy Consumption, Btu/ton refuse							71,504

*Transportation from collection route to landfill. Excludes on-route fuel consumption.
§Transportation from collection route to transfer station. Excludes on-route fuel consumption.
#Transportation to landfill from transfer station.

TABLE 23
FUEL CONSUMPTION FROM
EXISTING DISPOSAL OPERATIONS (20,000 TPD)

Project Phase	Vehicle Type	No. of Vehicles	Hours/day	Diesel Fuel Use Gal/veh-hr	Gal/hr	Gal/day	Equivalent Energy Consumption MMBtu/hr	MMBtu/day
Transfer station	Rubber-tired loader	8	10	6	18	180	2.32	23
Working face of landfill	Refuse compactor	8	10	16	128	1,280	16.51	165
	Crawler tractor	16	10	14	224	2,240	28.89	289
Application of daily cover	Crawler tractor	4	10	14	56	560	7.22	72
Dust control and road maintenance	5,000-gal tanker truck	4	10	10	40	400	5.16	52
	Motor grader	8	10	7	56	560	7.22	72
Miscellaneous	Utility truck	4	2	5	20	40	2.58	5
TOTAL						5,260		678
Total Fuel Consumption, gallons/ton refuse						0.26		
Total Energy Consumption, Btu/ton refuse								33,922

NOTE: Excludes transportation by collection vehicles, transfer truck/trailers, or rail. Estimates based on 4,000-5,000 tpd landfills and 1,000-3,000 tpd equivalent transfer station.

IV. Environmental Consequences

This section forms the scientific and analytic basis for the discussion of the environmental impacts of the alternatives including the proposed action. It includes discussions of:

1. Direct effects and their significance.

2. Indirect effects and their significance.

3. Possible conflicts between the proposed action and the objectives of federal, regional, state, and local (and in the case of a reservation, Indian tribe) land use plans, policies, and controls for the area concerned.

4. Energy requirements and conservation potential of various alternatives and mitigation measures.

5. Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.

6. Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.

7. Means to mitigate adverse environmental impacts.

Direct impacts are normally divided into short- and long-term. Short-term impacts are of short duration and usually caused during the construction phase of the project. The traffic generated by construction vehicles is a short-term impact. The dust created during construction is a short-term impact.

The short-term construction impacts related to the technical areas of air quality, biology, noise, cultural resources, and paleontology are discussed in this draft EIS/EIR. Construction impacts for other areas would not be expected to be significant. These areas include water quality, land use, drainage, growth inducement and socioeconomics, geology and mineral resources, visual resources, utilities, and energy.

A. Water Quality and Use

The land exchange, and railroad and road right-of-way grants would not have any water quality impacts. Therefore, only the landfill operations portion of the proposed action and its alternatives which has the potential for water quality impacts is discussed below.

1. Groundwater Quality/Leachate Production

Assumptions and Assessment Guidelines. Leachate is created when water, regardless of its source, moves through refuse fill and dissolves soluble substances contained in the fill. The potential sources of water for leachate generation include (a) infiltration of direct precipitation and of uncontrolled surface water run-on; (b) the intrinsic moisture content of the refuse; (c) water produced by the microbiological reactions that occur during anaerobic decomposition of the buried refuse; and (d) infiltration of refuse from groundwater. Leachate is typically a solution containing dissolved or finely suspended solid matter, dissolved organic waste, and end products of microbial decomposition. Landfill leachate is basically a wastewater characterized by nonneutral pH, high biological oxygen demand and chemical oxygen demand, and relatively high concentrations of dissolved inorganic substances, possibly including heavy metals. If the capacity of the refuse fill to retain water (field capacity) is exceeded, water may be discharged into adjacent materials. If these materials are sufficiently permeable so that they are capable of transmitting significant quantities of fluids, migration of leachate to groundwater can occur. For any leachate migration to occur, moisture in the landfill must exceed the field capacity of the refuse fill.

Any migration of leachate from the landfill which would result in the degradation of local groundwater would be considered a significant adverse impact.

a. Proposed Action

Impacts

A prerequisite for leachate escape is the presence of free leachate in the landfill. The addition of water to the landfilled refuse from direct precipitation at Eagle Mountain is expected to be minimal, because of the arid climate. The average rainfall is approximately three inches per year. Considerably more moisture will probably be lost from the refuse through evaporation (pan evaporation was measured by Kaiser at approximately 155 inches per year) than is added through direct precipitation, since it is expected that the refuse will be exposed to some drying influence under the layer of daily cover.

In addition, modeling using the Thornthwaite water balance method (Thornthwaite and Mather 1957) indicates that when climatic and soil conditions are taken into account, no moisture is expected to infiltrate the final landfill cover. To determine if free leachate might form in the landfill, the EPA HELP computer model (n.d.) was applied with the assumption that the proposed landfill had been completely filled with refuse but that only 50 percent of final cover had been installed. In a 100-year simulation, the HELP model indicated that no free leachate would accumulate in the landfill.

Uncontrolled run-on to the landfill is also expected to be minimal. Drainage in the area surrounding the landfill will be subject to engineering controls described in the drainage section. These controls are expected to reduce greatly or eliminate run-on.

Accumulation of moisture generated during anaerobic decomposition is expected to be small. Water is normally generated during anaerobic decomposition at very low rates. Microbial decomposition rates are expected to be low as well.

Direct infiltration of groundwater into the refuse fill could, in theory, provide a source of water for leachate generation. Infiltration of groundwater could be expected only if the upper level of groundwater reaches an elevation greater than the lowest level of refuse. This is considered unlikely because refuse will be placed well above the highest historical level achieved by groundwater. The amount of separation will be subject to approval by the RWQCB.

The opportunity for migration of leachate from the landfill results from water content reaching field capacity within the refuse. If leachate were not removed from the landfill, the accumulation of fluids could result in free liquid pooling on the landfill liner. Once the liner becomes saturated and a sufficient fluid head is applied, leachate could move through the liner. Even if this was to occur, the volume of leachate penetration through time is expected to be very low.

If leachate were to escape from the landfill, it would encounter either bedrock or older alluvium. Areas to be filled during the first 60 to 65 years of landfill operation will all overlie bedrock. The intergranular permeability of the bedrock underlying the East Pit is very low, on the order of 1×10^{-9} to 1×10^{-11} cm/sec based on lithology. Extensive fracturing of this type of material, however, may increase the net permeability to the range of 1×10^{-3} to 1×10^{-6} cm/sec.

The lateral distance from the easternmost portion of the fill area eastward to the nearest alluvium is approximately 4,500 feet. Geological mapping of the East Pit areas reveals a general pattern of two major sets of bedrock joints (planar fractures). These trend approximately north-northwest/south-southwest, and east/west. Fractures may control or influence the direction of groundwater flow.

For the purpose of calculating the maximum worst-case expected flow velocity, it was assumed that potential leachate movement will be through bedrock fractures with an effective permeability averaging 1×10^{-3} cm/sec (a high value for rocks of this type). If the groundwater gradient averages 0.01 and the porosity of fractured bedrock is 10 percent, the resulting flow velocity is 1×10^{-4} cm/sec, or about 100 feet per year (30 meters per year). This indicates that groundwater affected by leachate leaking from the portion of the site first filled could move into the alluvium in 45 years (note that these numbers do not take into account the attenuation of pollutant movement which commonly occurs due to absorption and desorption of dissolved substances on the surface of geologic materials through which groundwater travels; these effects would tend to slow the movement of pollutants).

Based on relative permeabilities, the movement of groundwater is expected to be more rapid in alluvium than in fractured bedrock. Flow rates of 300 feet per year could occur, although the movement of a pollutant plume would be somewhat slower due to the adsorption of pollutants on the surface of sediment grains. Along with adsorption and diffusion, the dilution of leachate-affected water by groundwater already residing in the alluvium would tend to reduce the concentration of pollutants.

Indications of low permeability in the alluvial aquifer in this area, along with the fact that the gradient reversal from a generally eastward flow in the valley to a westward flow occurs near the alluvium/bedrock interface, suggests that communication between alluvial and bedrock aquifers is limited, at least locally. This could be due to the presence of debris flow, fault gouge, or other relatively low-permeability deposits near the eastern edge of the East Pit. Low recharge rates following bailing or pumping in both MW-1 and MW-2 suggest low permeability of at least some alluvial sediments near the margin of the Chuckwalla Valley. In situ aquifer testing at MW-2 indicates permeability may be as low as 7×10^{-6} cm/sec. Low-permeability alluvial deposits may be acting to limit communication between the bedrock aquifer in the mine area and more permeable portions of the alluvial aquifer found further to the east and thus facilitating formation of a groundwater divide near the bedrock/alluvium interface.

The escape of leachate from the landfill is considered unlikely, since the bottom portions of the landfill will be lined with a layer of low-permeability soil and a synthetic liner (as required by the appropriate permitting agency). In addition, leachate which accumulates at the base of the landfill will be collected and pumped out of the landfill for treatment and disposal. If the leakage of leachate were to occur, it would be anticipated from the lowest elevation portions of the excavation. Bedrock is found beneath these portions of the landfill.

The following measures have been incorporated into the project design to prevent leachate migration into local groundwater.

Landfill Liner. California Code of Regulations, Title 23, Division 3, Chapter 15 (1984) state that new Class III landfills shall be sited where soil characteristics, distance from waste to groundwater, and other factors will ensure that no impairment of beneficial uses of surface or groundwater occur beneath or adjacent to the landfill. Although factors such as annual precipitation, background quality of groundwater, and current and anticipated use of groundwater indicate that there will be no impairment of beneficial uses of groundwater, the entire area underlying refuse will be lined.

A preliminary determination by the County Solid Waste Division would require that MRC construct a composite liner consisting of clay and plastic over certain portions of the landfill.

The area likely to require the composite cover would be the lowest elevations of the landfill—those most likely to receive leachate. All other areas underlying refuse (floor and side slopes) would be lined with a clay liner. Both the composite liner and the clay liner would use the reserve of low-permeability fine tailing from previous ore mining operations at the site. When compacted to 90 percent of maximum density, the tailing material displays laboratory permeabilities ranging from a low of 1×10^{-8} to a maximum of 8.8×10^{-6} cm/sec. The lower end of this range falls within the performance standard identified above. Quality control testing will be performed during liner placement to ensure that only material with permeability below 1×10^{-6} cm/sec is used for liner. Other physical properties of the tailing material are consistent with its use as a landfill liner, and no hazardous concentrations of metals or other substances have been found to be contained in the material (Hanson 1990; SCS Engineers 1988a, 1989a). The low-permeability, on-site material meets other Chapter 15 requirements for "clay liners," which are that at least 80 percent of the material shall pass a No. 200 U.S. Standard sieve and that the soil have a significant clay content and be classified SC, CL, or CH in the Unified Soil Classification system.

Drainage Control. Landfill design will include a drainage control system which will minimize run-on of surface water. The drainage system is described fully in the Drainage section (Section IV.F.). Minimization of run-on will decrease the water available for leachate production in the landfill.

Leachate Collection System. Landfill design will include a leachate collection system to allow removal of accumulated leachate if it is formed. By minimizing the quantity of leachate which accumulates in the landfill, the operator will minimize the opportunity for leakage of leachate. The specific details of leachate collection system design are schematically shown in Figures 23-26. The system is addressed fully in Appendix C.

Daily Soil Cover of Refuse. The entry of moisture to the refuse will be further inhibited by a final cover which includes a low-permeability layer of soil placed over completed sections of the landfill. Final cover will consist of several layers of soil and will be designed and constructed to minimize percolation of precipitation through refuse. The lowest layer will consist of a minimum two feet of compacted foundation material; above this, a minimum one-foot-thick layer of compacted soil will be emplaced, with a permeability equal to or less than the landfill liner; the top of the final cover, a layer consisting of not less than one foot of soil, will be designed to support vegetative growth. Actual specifications of the final cover will be approved by the applicable permitting agency.

An intermediate cover will be placed over those sections of the landfill which are expected to remain inactive for extended periods of time. Intermediate cover will be designed and constructed to minimize the percolation of precipitation through refuse.

LFG Control System. Migrating LFG that contains volatile organic compounds can be a source of groundwater pollution, if uncontrolled. In addition, carbon dioxide in LFG can dissolve in groundwater and result in lower pH, which could, in turn, mobilize metal ions.

These sources of potential groundwater degradation will be controlled by recovering LFG from the landfill. By preventing the buildup of LFG, the driving force behind gas migration will be removed. The LFG control and recovery systems are described more fully in the Air Quality section. Additional controls on LFG migration will be provided by the low-permeability landfill liner, which will minimize lateral migration of gas.

Phasing. It is possible that if the lowest portion of the landfill were to extend below the projected water table, groundwater pressure at significant head on the outside of the liner could cause liner failure and subsequent entry of groundwater into the landfill. As a mitigation measure to prevent this possibility, refuse will be placed at a level well above the highest-historically known groundwater level. The lowest point in the present East Pit excavation is at an elevation of approximately 705 feet above MSL. When the central portion of the East Pit is scheduled for landfilling, this level will be raised substantially by filling the lowest part of the East Pit with coarse tailing material or overburden to a level determined by the appropriate approving agency. The phasing plan for the landfill avoids disposal in the deepest part of the East Pit for some 80 to 85 years. This degree of separation between historic groundwater levels and the lowest elevation where landfilling will occur and the installation of a leachate control and monitoring system are anticipated to mitigate this potential impact to levels of insignificance.

The impact of landfill leachate on usable groundwater is not expected to be significant because of the relatively small quantities of leachate that will be generated in this landfill, because of planned engineering controls such as a low-permeability liner and leachate collection system, and because of the isolation of the site from areas of beneficially used groundwater.

Groundwater Monitoring. To provide ongoing groundwater monitoring during landfill operations and following landfill closure, a system of detection/monitoring wells will be installed. This system will be designed to detect movement of pollutants from the area of the landfill in groundwater. For this purpose, wells will be placed downgradient close to the margin of the landfill. Water quality at these points of compliance will be compared with background water quality.

Title 23, CCR, Chapter 15 regulations specify that a sufficient number of wells shall be installed to monitor background water quality and water quality at points of compliance. The wells must be logged by a geologist and must be able to accurately monitor water level and chemical indicator parameters. Prior to installation of the groundwater monitoring system, approval of the proposed program will be obtained from the RWQCB.

At present, five dedicated monitoring wells exist in proximity to the area proposed for landfilling. These wells will be supplemented by other groundwater monitoring wells located downgradient of the landfill. Due to the size and configuration of the landfill, it is anticipated that a minimum of four downgradient wells will initially be monitored. In addition, at least one groundwater monitoring well will be constructed upgradient of the landfill, so that water quality can be measured in an area beyond the potential effect of the landfill. The number and the location of wells will be determined during the permitting stages of landfill design, subject to approval by the RWQCB.

Construction methods and details of the groundwater monitoring wells will be approved by the RWQCB. Alluvial wells will be drilled probably using air or mud rotary methods. The bedrock wells will be drilled probably using air rotary methods in conjunction with a downhole percussive tool. Samples will be collected during drilling to provide information on lithology. A log of each well will be prepared by an on-site geologist working under the direct supervision of a geologist registered in the state of California. The well log will include information on well location, driller, drilling equipment, borehole diameter, depth, dates and times that various operations were performed, and geological observations.

The wells will be sampled and analyses regularly performed as specified by the RWQCB in their waste discharge requirements. It is anticipated that laboratory analyses will consist of a number of tests selected from among the ones being performed for background groundwater monitoring (described in the subsection on background groundwater quality monitoring).

Mitigation

The project design includes specific measures to mitigate potential groundwater quality impacts. These measures discussed above include the installation of a composite liner, a drainage control system, a leachate collection system, daily compacted soil cover of refuse, an LFG collection system, project phasing, and groundwater monitoring wells. No additional mitigation would be required.

Significance After Mitigation

The proposed action would not result in any significant impacts to groundwater quality.

b. Reduced Landfill Operations Alternative

Impacts

The impacts for the reduced landfill operations alternative would be slightly less than the proposed action and not considered significant.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

The reduced landfill operations alternative would not result in any significant impacts to groundwater quality.

c. Proposed Action with Rail Access Only Alternative

Impacts

This alternative would result in similar impacts as the reduced landfill operations alternative.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

There would be no significant impacts to groundwater quality as a result of the rail access only alternative.

d. No Action Alternative

Impacts

The No Project alternative would avoid all potential impacts and the need for mitigation measures identified in conjunction with the proposed action.

Mitigation

No mitigation would be required.

Significance After Mitigation

This alternative avoids all potential impacts.

2. Surface Water Quality

Assumptions and Assessment Guidelines. During operation of the proposed landfill, pollution of surface waters could result from the contact of surface water with refuse. The potential sources of surface water are precipitation, run-on from surrounding slopes, and run-on of floodwaters from Eagle Creek. Impacts to surface water quality would be considered significant if there were bodies of surface water within one mile of the landfill site which could be adversely impacted by the proposed landfill operations.

a. Proposed Action

Impact

Prior to the filling of the East Pit to existing surrounding grade, surface waters which might enter the landfill would be diverted to avoid contact with the refuse. The final landfill surface would be elevated above the present East Pit rim. A low-permeability layer that would separate the surface water from the refuse will be incorporated into the final area of the landfill.

Because of the low level of precipitation in the area, and with the implementation of the planned landfill cover provisions, it is anticipated that impacts on downstream surface water will be insignificant. Mitigation measures recommended for the drainage system are described in the drainage section.

The exposed portion of the Colorado River Aqueduct, which crosses the Chuckwalla Valley, is approximately 6,000 feet east-northeast from the nearest part of the proposed landfill. Because of the distance involved, it is not anticipated that windblown material would be deposited in the aqueduct. Landfill operations will include protective fencing and a litter control program and will ensure that refuse is promptly incorporated into the working face of the landfill to limit the opportunity for litter formation. Further, the section of the aqueduct adjacent to the project site is covered.

The impact of the proposed landfill on surface water quality is expected to be insignificant, because there are no bodies of surface water within one mile of the landfill site with the exception of the industrial pond. Nevertheless, the following measures to ensure the protection of the quality of surface waters in the vicinity of the landfill have been incorporated into the project design:

a) Compaction of waste prior to placement in containers to minimize the escape of paper and light material.

b) The use of closed containers for transport of refuse to the working face of the landfill.

c) Compaction of refuse into the working face of the landfill as rapidly as practicable to reduce the opportunity for the spread of litter.

d) Installation of fencing to trap windblown litter.

e) Regular litter pickup by landfill personnel to control the spread of litter within the landfill and to prevent litter from spreading beyond the project boundaries. Litter control is described in more detail in the recreation and visual resources section of this draft EIS/EIR.

f) Use of watering to control dust emissions as described in the Air Quality section.

g) Recycling and treatment of truck/container wash water.

h) Application of at least six inches of compacted soil as daily cover over the refuse at the end of each working day.

i) Diversion of surface run-on within the East Pit.

Mitigation

The proposed action would not result in significant surface water quality impacts; thus, no mitigation is required. However, to ensure the protection of the quality of surface waters in the vicinity of the landfill, the project design includes the following measures: compaction of waste; use of closed containers for transport of refuse; installation of fencing to trap windblown litter; regular litter pickup, watering for dust control, daily cover over the refuse, and diversion of surface run-on within the East Pit. These project components are described in detail above.

Significance After Mitigation

There will be no significant impacts to surface water quality. Mitigation measures were added to the project design to ensure the protection of surface water quality.

b. Reduced Landfill Operations Alternative

Impact

As the effects of the proposed action are not found to be significant, the reduced landfill operations impacts on the quality of surface waters in the area would not be significant as well.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

All potential impacts to surface water quality for this alternative are considered insignificant.

c. Proposed Action with Rail Access Only Alternative

Impact

As the effects of the proposed action are not found to be significant, the rail access only alternative impacts on the quality of surface waters in the area would not be significant as well.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

All potential impacts to surface water quality for this alternative are considered insignificant.

d. No Action Alternative

Impact

This alternative would avoid all potential impacts.

Mitigation

No mitigation would be required.

Significance After Mitigation

This alternative avoids all potential impacts.

3. Groundwater Use and Water Supply

Assumptions and Assessment Guidelines. Impacts from the proposed action would be considered significant if it is determined that the landfill operations would deplete substantially the region's groundwater resources.

a. Proposed Action

Impact

Numerous wells in the project vicinity provide water to the project area for agricultural, industrial, and domestic uses. Drinking water is provided by tanker truck or in bottles. The landfill operation's maximum water consumption is expected to be about 1,793 acre-feet per year with a 10 percent contingency allowance for worst-case analysis which totals to approximately 1,972 acre-feet per year. About 1,650 acre-feet of the total will be used for haul road dust control and the remainder for container cleaning, vehicle wash and maintenance, personal use, liner preparation, landscaping, and daily cover dust control. Due to evaporation, none of this water would recharge the groundwater supply. A summary of expected water consumption associated with the landfill operations is shown below.

Landfill Activity	Acre-feet per year
Haul road dust control	1,650
Container cleaner	7
Vehicle wash and maintenance	16
Personal use	7
Liner preparation	7
Landscaping	11
Daily cover dust control	95
Subtotal	1,793
10% contingency allowance	179
TOTAL USAGE	1,972

Based on Mann's study (1986), approximately 23,000 acre-feet per year of groundwater is used in northwestern Chuckwalla Valley. The total inflow to the basin is estimated at 12,240 acre-feet per year. Thus, the net drawdown per year calculates to 10,760 acre-feet. Table 9 shows the various water uses in 1986 contributing to this net drawdown. If this drawdown remained constant, and using the total groundwater reserve estimate of 6 million acre-feet based on U.S. Geological Survey calculations of basin water resources discussed earlier, approximately 557 years of groundwater reserves remain.

The total water usage anticipated from landfill operations is approximately 1,972 acre-feet per year, as shown above. Adding the project's water consumption to Mann's estimated 1986 water uses, this amount calculates to a total net water consumption amount of 12,732 acre-feet per year for the life of the project (115 years). If all other conditions remained the same, the increased water use would reduce the time for total drawdown from 557 years to 536 years. This is not a substantial depletion of the region's groundwater resources and, thus, is not considered a significant impact.

While approximately 88 percent of the region's total water consumption is dedicated to agricultural uses, the project's water consumption would represent approximately eight percent. However, because the region's water resources are currently in an overdraft condition, any additional water use would represent a cumulative impact on the region's water resources. Because this is not a substantial contribution to the overdraft condition, this cumulative impact to the region's water resources is not considered significant.

The proposed landfill operation is anticipated to generate a maximum of 163 jobs which translates to an increase in population of roughly 587 people. Based on these figures, this would create a need for approximately 145,500 gallons of domestic water per day. The overall increase in water demand for domestic use would equate to about 163 acre-feet per year. This would incrementally add to the cumulative adverse effects on the groundwater supply in the region.

Mitigation

Impacts to groundwater use and supply are not considered significant, and no mitigation is required.

Significance After Mitigation

Direct and cumulative impacts to the potential groundwater supply are not considered significant.

b. Reduced Landfill Operations Alternative

Impact

It is estimated that overall water consumption associated with the reduced landfill operations alternative would decrease approximately 10 percent or 197 acre-feet/year less than the proposed action. The Chuckwalla Valley would continue to exist in an overdraft condition. Based on the reduced landfill operations alternative, cumulative impacts to the groundwater supply of the region would exist, but they are not considered significant.

Mitigation

No mitigation is required.

Significance After Mitigation

Direct and cumulative impacts to the potential groundwater supply are not considered significant.

c. Proposed Action with Rail Access Only Alternative

Impact

Cumulative water consumption impacts resulting from the rail access only alternative would be the same as those associated with the reduced landfill alternative.

Mitigation

Mitigation is not required.

Significance After Mitigation

Cumulative impacts to the potential groundwater supply are not significant.

d. No Action Alternative

Impact

Under this alternative landfill operations would not occur; therefore, water consumption impacts would not exist. However, it should be noted that the land exchange would not take place under the no action alternative. Subsequently, BLM would have patented mining claims on the subject property and potential mining activities could reoccur which would impact the groundwater reserves. Water use during mining consumed approximately three times the projected water use of the proposed action.

Mitigation

No mitigation would be required.

Significance After Mitigation

This alternative does not avoid potential impacts to groundwater supply.

B. Public Health and Safety

The landfill construction and operations, the BLM/Kaiser Steel Resources, Inc. land exchange, the Eagle Mountain rail line and Eagle Mountain Road Extension right-of-way grants, and Riverside County Plan Amendment would not have any significant impacts on public health and safety. The following discussion provides a detailed evaluation of the effect of the proposed action on hazardous wastes in the waste stream; landfill gas and gas condensate; fires; vector and disease control; and worker and public safety.

1. Hazardous Wastes in the Solid Waste Stream

Assumptions and Assessment Guidelines. For impact analyses, assumptions were made based on the known information regarding the waste stream to a landfill. Several state and federal statutes and regulations govern the handling and disposal of hazardous wastes. Recent state law requires significant reductions in the volume of solid waste going to landfills. Since there are no available numerical guidelines for this issue, it will be presumed that the operation of transfer stations, transportation systems, and the project itself in a manner that is consistent with all applicable regulations governing the handling of hazardous and nonhazardous waste will avoid significant impacts. No evidence exists that the small percentages of hazardous materials found in the current solid waste stream pose a significant health problem to the public.

a. Proposed Action

Impacts

Exposure to hazardous materials would be greatest at off-site waste transfer stations and materials recovery facilities. Although these facilities are not permitted or covered by any of the approval actions directly related to the Eagle Mountain landfill project, they are discussed here since they are related to the project in a secondary manner. At these transfer stations and materials recovery facilities, waste would be sorted and separated prior to being transferred to containers for transport to the landfill site. The sorting process typically involves hand removal of unacceptable materials—liquid waste, hazardous waste, sewage sludge, incineration ash, radioactive, biological, or infectious waste, or other special solid wastes—from the nonhazardous solid waste spread on a tipping floor. Any hazardous waste would be set aside for special handling in accordance with procedures established in solid waste facilities permits which govern the operation of these facilities.

The actual siting of the off-site transfer stations themselves is a matter for regulation by the local jurisdictions containing the stations and the appropriate state agencies. Because of the need for rail access, it is reasonable to assume that most transfer stations would be located in industrial areas. The detailed siting criteria, buffers, means to restrict public access, and other requirements for the transfer stations would be established in a local conditional use permit (or similar land use permit) and in the solid waste facilities permit required for each station. These measures would also reduce the potential for public exposure to hazardous materials at the transfer stations or materials recovery facilities.

With respect to the potential for public exposure to hazardous wastes in the material at the project site itself, it would be reduced by the sorting process described above. This requirement for screening and removal of hazardous waste at processing and transfer stations and materials recovery facilities is a typical component of permits applicable to those activities. The review of the California Integrated Waste Management Board in approving solid waste facilities permits and a load check program where the County of Riverside has inspection rights for all solid waste coming to the project will monitor this requirement. Any waste generated from the Desert Center or other local areas will be inspected for hazardous wastes at an on-site inspection station located in the Phase II container handling yards.

All refuse transported to the project site will also be screened to detect the presence of radioactive materials. Inspection would be accomplished by passing the refuse (MRF) or containers (landfill) under a detection device to detect materials that are emitting radioactivity. If radioactive materials are detected, intensive manual inspection of the load using hand-held detection equipment will be performed. The offending materials will be segregated from the load and stored in accordance with applicable regulations pending disposal at a licensed facility.

Hazardous materials and wastes such as solvents, fuels, and other products used for maintenance or otherwise generated on-site would be collected, stored, and transported for proper disposal in accordance with applicable regulations as with the hazardous materials discovered in the waste stream.

In summary, the potential for public exposure to hazardous wastes is not a significant impact for two reasons: the concentration of hazardous wastes in the municipal waste stream is quite small for the reasons discussed above, and the operation of the project is such that the public would not have access to areas where solid waste is handled, transported, or placed.

On a more fundamental level, the elimination of hazardous waste from municipal refuse depends on compliance by the public with applicable regulations. Increased public education, further availability of recycling, and measures to promote source reduction must be pursued by local governments and agencies charged with regulating hazardous wastes. Many communities in the state have programs and facilities so that the residents have a convenient way of disposing of small quantities of hazardous household materials to avoid indiscriminate dumping of those materials. Continued efforts by communities to provide these facilities will further limit the small amount of hazardous materials entering the municipal solid waste stream.

The railroad and Eagle Mountain Road right-of-way grants, as well as the exchange of public and private lands will have no impact on hazardous waste in the waste stream.

Mitigation

Despite the fact that the concentration of hazardous waste in the waste stream is quite small and the public in not generally exposed to the waste stream, protective measures would be incorporated into the project design. These measures, described in detail above and in the project description, include the inspection and screening of refuse and the removal of hazardous materials encountered at local MRFs and additional waste inspection at a regional level by the Riverside County Local Enforcement Agency. No other specific mitigation measures beyond these existing requirements and aspects of the project design are necessary.

Significance After Mitigation

The potential for public exposure to hazardous materials is not significant.

b. Reduced Landfill Operations Alternative

Impacts

The slight overall reduction in daily waste disposal under this alternative would result in a further slight reduction in the potential for public exposure to hazardous wastes. This alternative would not alter the conclusions regarding impacts and mitigation related to hazardous wastes.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

The potential for public exposure to hazardous materials is not significant.

c. Proposed Action with Rail Access Only Alternative

Impacts

The slight overall reduction in daily waste disposal under this alternative would result in a further slight reduction in the potential for public exposure to hazardous wastes. The difference would not, however, be significant or notable.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

The potential for public exposure to hazardous materials is not significant.

d. No Action Alternative

Impacts

This alternative would avoid any potential exposure to hazardous materials in the refuse generated on-site or during long-distance transport of solid waste. Typical exposures which are associated with municipal solid waste generation, collection, transfer, and disposal in conventional landfills, including the Desert Center Sanitary Landfill, would continue throughout southern California.

If the land exchange does not occur and the ownership of the Eagle Mountain townsite reverts to BLM, it is possible that BLM could sell property in the townsite to private citizens. If this occurs, the Desert Center Sanitary Landfill would process slight increases of solid waste with a slightly increased potential for encountering hazardous materials.

Mitigation

No mitigation is required with this alternative.

Significance After Mitigation

The potential for public exposure to hazardous materials is not significant.

2. Landfill Gas and Landfill Gas Condensate

Assumptions and Assessment Guidelines. The following impact assessment is based on the applicable federal and state regulations for landfill gas and landfill gas condensate. These regulations govern the control and monitoring of LFG emissions and their disposal. Potential hazards to site personnel resulting from accidental spills due to the generation and handling of LFG condensate would be considered a significant public health and safety impact. A significant impact would also be assessed for public exposure to LFG through subsurface migration and groundwater pollution.

a. Proposed Action

Impacts

The rate of LFG production would be dependent on many factors, the most important of which include refuse composition and tonnage, and moisture content. A range of estimates of LFG to be generated at the Eagle Mountain site was prepared for the lifetime of the project (1992–2097). These estimates are based on the following assumptions:

- Unit refuse generation rates are expected to range between 0.02 cubic feet of LFG per pound of in-place refuse per year (cu ft/lb-yr) and 0.07 cu ft/lb-yr.
- A one-year lag time between refuse placement and initiation of anaerobic decomposition.
- The landfill site will reach its maximum refuse input of 20,000 tons per day in 5 years (by 1997), an optimistic assumption.
- Waste composition and moisture content will remain unchanged (a worst- case scenario). That is, recycling or other waste reduction efforts will not affect significantly LFG generation.

During the first few years of operation, little or no LFG would be produced. By the end of the second year of operation (1993), up to 1million cubic feet per day of LFG may be produced. By the year 2092, the daily generation rate is expected to range between 78 and 82 million cubic feet per day. The reader should be cautioned, however; estimates of LFG production beyond a 20- to 30-year period are speculative. Within the next 100 years, there will be significant technological changes, including the methods by which wastes are generated, collected, recycled, and ultimately disposed and the types of waste generated. The quantities and types of materials requiring landfill disposal and, hence, the amount of LFG generated, are subject to change pending future technological advancements and environmental, economic, and political considerations.

If not controlled, the LFG could migrate horizontally through fractured bedrock or alluvial soils surrounding the East Pit area, through fill slopes, or vertically through the landfill cover. Safety problems and an explosion hazard could be potentially caused by LFG generation and migration principally due to its methane content. Methane (the natural gas used in most households) is an odorless gas which is potentially explosive at concentrations between 5 and 15 percent by volume in air. In the landfill mass itself, methane will not explode, because there is insufficient oxygen available to support combustion. However, in the absence of LFG control measures, gas can migrate to and accumulate in confined spaces such as subfloor areas, basements, utility vaults, and ducts. If an ignition source such as a pilot flame or electrical spark is provided, a fire or explosion could result. Methane can also accumulate in buildings above the ground surface, particularly in wall spaces and other enclosed areas. Permanent structures proposed as part of the landfill project include one or more buildings to be located in the container handling yard. These facilities would include an office, employee area, storage provisions, and laboratory. Measures to mitigate against gas migration into on-site or off-site structures are warranted and are discussed below.

There is also a potential for subsurface migration of LFG and its subsequent release into enclosed structures. Under certain conditions, the VOC content of LFG can present health hazards. Data regarding composition of LFG, anticipated concentrations, and their effects are presented under Section IV.D., Air Quality. In general terms, with the implementation of proper LFG migration control techniques and considering natural dilution effects, the potential for subsurface migration of unhealthful concentrations of VOCs into indoor environments is considered to be remote. The acute toxicity effects of these compounds are not a concern unless humans were to be exposed to undiluted LFG. In this case, asphyxiation would be the imminent hazard.

Another possible impact from LFG is groundwater pollution if the LFG contacts subsurface waters and increases dissolved carbon dioxide concentrations or transfers VOCs to groundwater. If LFG becomes present in the root zone of plants, it may reduce the ability of vegetation planted on the landfill surface to grow adequately.

The quantity of condensate generated during the LFG extraction process is a function of LFG and ambient temperatures, flow rates, recovery system design, and operating parameters. A range of 240 to 670 gallons of condensate generated per million cubic feet (at standard temperature and pressure) of LFG recovered has been reported (SCS Engineers 1987). By the year 2092, approximately 11,500 gallons of condensate could be generated on a daily basis. This estimate is based on an LFG generation rate of 56 million standard cubic feet per day, an 80 percent gas recovery factor, and worst-case conditions for ambient temperature (using 56 degrees Fahrenheit).

Potential impacts related to the generation and handling of LFG condensate include pollution of surface or groundwater and potential hazards to site personnel due to accidental spills. Pollution of surface or groundwater is discussed in the Water Quality section of this draft EIS/EIR.

As required by the appropriate permitting agencies, the area over which refuse will be placed will be lined with fine tailing remaining from the iron mining operation and, in certain locations, a synthetic liner. The extent of coverage, thickness, and permeability of the material will be defined by the permitting agency. Details on the construction of the liner are included in Section IV.A., Water Quality. The liner would restrict the downward or lateral gas movement so that the gas can be recovered by the LFG extraction system.

Clay liners can be subject to cracking or desiccation when allowed to dry out (as may occur when used solely as landfill cover). However, the proposed liner at Eagle Mountain is expected to maintain its integrity due to the fact that it will not be exposed to the atmosphere and trace moisture inherent to the landfill mass and the generated LFG will help retard drying or cracking. As a primary mitigation measure, the liner is expected to effectively impede LFG migration.

The LFG recovery/utilization and migration control system would be designed and constructed to capture gases and effectively impede gas migration and potential groundwater pollution from this source. These measures are discussed in Sections IV.A., Water Quality, and IV.D., Air Quality, respectively. LFG systems, however, cannot collect all of the gas generated in a landfill. The percentage of gas that would be collected is a function of landfill geometry, permeability of the landfill cover, and the design and operating efficiency of the system. LFG recovery rates are not readily measurable. Due to the placement of the liner, the depth of fill, and the fact that the system would be constructed as the fill advances, it is anticipated that the gas recoverability at Eagle Mountain would be relatively high. For purposes of this draft EIS/EIR, a recovery factor of 80 percent is assumed.

Using the above estimate and peak projections of gas generation, up to 16.4 million cubic feet per day of LFG could be generated that may not be captured by the recovery system. Most of this gas would migrate to the air through intermediate cover soils and fill side slopes (those not in contact with the liner and wall of the East Pit). There is a remote possibility that some of the LFG could migrate through adjacent soils away from the landfill mass.

Permanent subsurface LFG monitoring wells or detectors/ alarms will be placed near structures in the immediate vicinity of the East Pit, including those proposed for maintenance and container handling offices. Structures in the town of Eagle Mountain would not be affected by LFG migration due to their distance from the refuse mass and implementation of the above control methods. To provide assurance that there is no potential problem, routine subsurface monitoring is recommended for this area. Since there are several hundred buildings in the town, it would be impractical to install and test wells near every structure. A network of five to six monitoring wells would be placed on approximate 1,000-foot centers in soils along the northern town perimeter. The wells will be constructed to allow monitoring to a depth of 20 feet below grade. Specific monitoring well locations, depth, design specifications, and sampling frequencies would be subject to approval of the Riverside County Department of Health as part of the solid waste facilities permit.

If applicable, subfloor LFG protection measures will be incorporated into the design and construction of all permanent structures proposed as part of the landfill project. These could include installation of any one or a combination of the following:

1) An impermeable membrane barrier below the foundation slab.

2) Active or passive subfloor ventilation provisions.

3) Special explosion-proof seals for all utility conduits entering structures from below grade.

4) Permanent monitoring probes installed in the subfloor environment to verify system effectiveness.

LFG condensate is a potentially hazardous material and is subject to special provisions for its collection, handling, and disposal. The condensate will be collected in sumps at the low points of the LFG system and pumped into steel tanks and separated in the LFG treatment system. LFG tanks will be bermed to prevent spillage from reaching the environment. LFG condensate will be treated to separate the aqueous phase from the organic phase. The organic phase will be stored on-site as a hazardous waste for periodic removal to a licensed disposal facility. The water fraction will be used for dust control on unpaved roads or will be disposed of at the Kaiser sewerage treatment facility in the southeast portion of the town of Eagle Mountain. A more detailed discussion of leachate collection and treatment is provided in the project description.

The railroad and Eagle Mountain Road right-of-way grants and the public/private land exchange will have no impact on the production of LFG and LFG condensate.

Mitigation

The project design contains measures to minimize public health and safety impacts resulting from the migration of landfill gas and landfill gas condensate. These measures include the landfill liner, LFG collection system, and LFG condensate collection system designed to capture gases and impede gas migration as described above and elsewhere in this draft EIS/EIR. Specific requirements for LFG monitoring and any special building designs have not yet been determined. These will be established by the County Department of Health and the SCAQMD during their reviews of their respective permits for the project.

Significance After Mitigation

The measures incorporated into the project design will lower the potential public health and safety effects of LFG and LFG condensate to below a level of significance.

b. Reduced Landfill Operations Alternative

Impacts

The potential impacts for LFG and LFG condensate under this alternative would be identical with the proposed action. The measures to control LFG and LFG condensate under this alternative would be identical with those of the project as proposed. The daily refuse deposited would be slightly lower, but the overall capacity of the project would not be affected. The numerical estimates for the project would apply under this alternative.

Mitigation

Mitigation would be identical with the proposed action.

Significance After Mitigation

The proposed measures of this alternative will lower the potential public health and safety effects of LFG and LFG condensate to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

The potential impacts for LFG and LFG condensate under this alternative would be identical with the proposed action. The measures to control LFG and LFG condensate under this alternative would be identical with those of the project as proposed. The daily refuse deposited would be slightly lower, but the overall capacity of the project would not be affected. The numerical estimates for the project would apply under this alternative.

Mitigation

Mitigation would be identical with the proposed action.

Significance After Mitigation

The proposed measures under this alternative will mitigate the potential public health and safety effects of LFG and LFG condensate to below a level of significance.

d. No Action Alternative

Impacts

All public health and safety impacts represented by LFG and LFG condensate would be avoided at Eagle Mountain under this alternative.

Mitigation

No mitigation is required for this alternative.

Significance After Mitigation

The LFG and LFG condensate effects associated with this alternative are not considered significant.

3. Fires

Assumptions and Assessment Guidelines. Several types of potential fires exist in the transport and disposal of the municipal waste stream. Factors involved in assessing the significance of fire impacts are fire prevention, time of response, accessibility of response, impacts to surrounding areas during response, and by-products of combustion materials. Response time and fire protection are discussed in the Utilities and Services section of this draft EIS/EIR. Any increased public exposure to fires resulting from the proposed action would be considered a public health and safety hazard.

a. Proposed Action

Impacts

Subsurface Fires. All landfills contain the combustible materials, insulating characteristics, and other attributes necessary to allow subsurface combustion. The ignition and propagation of subsurface landfills are a function of several factors, including waste composition, moisture content, available oxygen, and ambient pressure in the area of combustion (Stearns and Petoyan 1984).

Subsurface landfill fires can occur as combustible refuse materials are heated, either through biological decomposition or chemical oxidation. A continuous source of oxygen is necessary for this process; oxidation of the refuse materials can generate heat to the point of combustion. As temperatures within the landfill increase, pyrolytic reactions may also occur.

Subsurface fires are usually triggered by either one of the following mechanisms:

1) Burial of "hot loads" with other refuse materials. The potential for this occurrence is not considered significant, as discussed below.

2) Improper operation of LFG recovery or migration control systems. Overdrawing LFG extraction wells or trenches, especially those installed near the perimeter, slope face, or fill surface, or breaks in the subsurface collection pipe caused by landfill settlement could result in a situation where air can be inadvertently drawn into the refuse mass. Open cracks and fissures in the landfill surface may facilitate drawing air through the site cover.

Open flames within the landfill are not likely to occur during a subsurface fire. However, subsurface fires may result in accelerated local settlement in the vicinity of the fire and venting of smoke or combustion by-products through the landfill. These by-products may include particulates, unburned hydrocarbons, carbon monoxide, and various volatile organic compounds, depending on the types of buried refuse. A more detailed discussion of surface fires can be found below.

Surface Fires. Surface fires at landfills are typically small and of short duration; excavation areas on the project site would serve as a firebreak in the event of a fire. Surface fires are normally limited to the working face and tipping area, except in those cases where a vehicle catches fire or burning refuse falls from a vehicle.

At the working face, the refuse subject to burning would be limited to that material deposited since the previous application of daily cover. The primary nuisance and potential hazard of a landfill fire are related to possible burn injuries, smoke exposure to workers near the fire area, and visible smoke emanating from the site. As a nuisance, smoke causes eye and throat irritation and unpleasant odors and detracts from the aesthetics of the location if visible from a distance. As stated previously, landfill surface fires are typically small and of short duration; therefore, the major potential impact is to landfill workers who extinguish these fires. The rapid dissipation of the smoke and the distance and location to the nearest residential uses in the town of Eagle Mountain reduce the potential significance of this impact.

Burning refuse may also release toxic emissions, depending on the type of refuse combusted. Since municipal solid waste generally contains only a small percentage of hazardous materials and because of the rapid dilution of smoke in the atmosphere, it is unlikely that nearby residents would be exposed to concentrations that pose a risk to health and safety in the event of a landfill fire.

Right-of-Way Fires. Sparks from the brakes of trains traveling through the arid desert climate may result in fires along the right-of-way. Although such occurrences are not likely to be frequent, portions of the Southern Pacific main line and the private rail line between Ferrum Junction and Eagle Mountain are susceptible to this impact. Since portions of the rail rights-of-way are not easily accessible except by four-wheel-drive vehicles, the emergency response capacity of County fire fighting services may be limited in the event of a right-of-way fire. Southern Pacific currently implements a vegetation/weed abatement policy to spray a federally approved herbicide 13 feet on each side of its right-of-way on an annual basis; however, at present there is no herbicide spraying permitted on the BLM right-of-way portion of the rail line.

A vegetation/weed abatement policy planned for the private rail line from Ferrum Junction to Eagle Mountain will be to use selective thinning and use of a ballast regulator rather than a herbicide. Potential impacts to biological resources are addressed in the Section IV.G. of this draft EIS/EIR.

Fires in Refuse Loads. Fires in refuse loads are possible through spontaneous ignition if correct conditions occur or from hot or smoldering materials, such as charcoal, that are thrown away in trash. While this type of fire is theoretically possible in any refuse, the potential within the proposed action is quite low for two reasons. First, all refuse in the project would have been screened at transfer stations where notably burning or smoking materials would have been removed or extinguished. Second, in the compaction process prior to loading waste into the transport containers, voids or air spaces capable of supplying oxygen to support combustion are greatly reduced. Thus, the potential hazard of fires within the waste containers is not considered a significant impact.

For the small proportion of waste that may be delivered to the site from the local area by conventional refuse hauler truck, the potential for load fires would remain.

The primary measure to avoid the occurrence of subsurface fires is to ensure that the LFG recovery system is properly operated and maintained. Particular care should be taken to minimize air infiltration into buried refuse. LFG recovery system operation and maintenance guidelines would be developed and implemented through the landfill permit process. These guidelines would include monitoring for parameters indicative of a subsurface fire (e.g., elevated temperature, carbon monoxide) which should be performed regularly and reported to the County Department of Health.

In the event a subsurface fire does occur, there are several options available for its control and elimination. If the fire is detected near the surface, it can be excavated and extinguished. For deeper subsurface fires, control can usually be achieved by retarding the influx of oxygen by closure of the LFG extraction wells or trenches in the area and sealing all cracks or fissures in cover soils. For difficult fires, deep borings can be drilled and liquid carbon dioxide can be pumped into the landfill. The liquid carbon dioxide cools the material and displaces oxygen and is very effective in controlling this type of fire. This type of staged response would be incorporated into the emergency response planning for the project.

Surface fires would not present a unique hazard and would be controlled through conventional fire response procedures. The on-site emergency response capabilities would have access to large watering trucks and earth-moving equipment for fire control. The local fire district response time is also quite good, since a new fire station is already planned for the community of Eagle Mountain.

As described above, the potential for fires within the refuse loads themselves is not expected to be great. The emergency response plan, staff, and equipment maintained on-site and at transfer stations would be adequate to respond to such incidents in conjunction with the local fire districts.

Potential fires within the railroad right-of-way are not expected to pose a significant hazard. To reduce the potential further, however, the operation plan by MRC would also include a regular inspection of the Eagle Mountain rail line and selective removal of vegetation or material within the right-of-way that may pose an increased fire hazard. The equipment and staff maintained on-site for the project operation and maintenance would also be available to respond to potential right-of-way fires. Mitigation for potential impacts to sensitive plant species along the right-of-way is outlined in Section IV.G. of this draft EIS/EIR.

The Eagle Mountain Road right-of-way and the exchange of public and private lands will have no impact on the potential for fires.

Mitigation

Features integrated into the project design to control potential fire hazards are discussed above and include such measures as the collection and control of landfill gases, the development and implementation of an emergency response plan for subsurface fires, conventional fire fighting procedures for surface fires, screening incoming waste and the removal of burning or smoking materials, and the maintenance of the railroad rights-of-way to remove vegetation and combustible materials.

Significance After Mitigation

The measures designed within the project and to be incorporated into the operating plans for the landfill would be adequate to control the potential fire hazards from the project. Thus, impacts would be below a level of significance.

b. Reduced Landfill Operations Alternative

Impacts

A change in the landfill configuration would not alter the daily operations of the project. The potential fire impacts, and response measures, under this alternative would be identical with the project as proposed.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

The measures designed within the project and to be incorporated into the operating plans for the landfill would be adequate to control the potential fire hazards from the project. Thus, impacts would be below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

The overall impacts of this alternative related to increased fire hazard would be the same as the project as proposed. Truck transport proposed by the project would not occur, and this would avoid the potential for fires related to truck operation. The difference would probably not be notable, however.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

The measures designed within the project and to be incorporated into the operating plans for the landfill would be adequate to control the potential fire hazards from the project. Thus, impacts would be below a level of significance.

d. No Action Alternative

Impacts

This alternative would avoid any new fire hazards at Eagle Mountain. The fire hazards at existing conventional landfills are similar to those of the project and would remain. For loads of waste which are taken to landfills without being processed through a transfer station, the potential fire hazard is slightly greater.

Mitigation

No mitigation is required.

Significance After Mitigation

This is not considered a significant impact.

4. Vector and Disease Control

Assumptions and Assessment Guidelines. According to the standards provided by the CIWMB, Title 14, CCR, Section 17707, the propagation, harborage, or attraction of flies, rodents, or other vectors should be controlled. This applies to transfer stations and landfill sites. Therefore, any propagation, harborage, or attraction of flies, rodents, or other vectors resulting from the proposed action would be considered a significant public health and safety impact.

a. Proposed Action

Impacts

The availability of food scraps, shelter, and breeding areas could attract animals, birds, and insects to the project site. The effect is likely to be similar to that related to the operation of other landfills and in some respects similar to other types of human activity. The most significant aspect of this impact is the potential to substantially increase the raven population, which in turn could lead to increased predation on the threatened desert tortoise. This issue is discussed fully in Section IV.G., Biological Resources. In other respects, the major concern is the potential to provide a breeding ground for disease-carrying organisms or other animals which are a nuisance in populated areas. Even though the site is isolated from large population centers, the proximity of the Eagle Mountain community warrants some concern for this issue. By implementing mitigation measures as part of the project design, the potential for attracting vectors, birds, animals, and insects to the site is low.

The primary measure to control the availability of food and refuse, and thus to minimize the attractiveness of the landfill to animals, is the state requirement that earthen cover material be placed over the refuse at least daily. The project plan would call for the placement of such cover at the end of the working day. During the daytime operation, the very intensive activity of heavy equipment spreading and compacting the refuse would serve to reduce the feeding and activities of most animals. The nighttime cover would minimize the availability of foodstuffs in the refuse and thus reduce the potential for a significant rodent or other animal population increase.

In addition to the earthen cover included in the project plan, the control of ravens and other birds during the day would occur through several proposed passive management techniques. These would include initially the use of monofilament line or other fencing or barriers to interfere with bird activity, possible use of "cracker shells" or other explosive noises to drive birds away, and a regular program to monitor the effectiveness of these measures. If more active management techniques are warranted, they will be pursued. This issue is described more fully in the biology section of this draft EIS/EIR.

The railroad and the Eagle Mountain Road right-of-way grants and the public/private land exchange would have no impact on vector and disease control.

Mitigation

The application of daily earthen cover as part of the project design is the primary measure to control vector populations at landfills. Additional measures such as installing appropriate barriers and using explosive noises have been incorporated in the the project design to control the raven population. These are described above and in the Biological Resources section of this draft EIS/EIR.

Significance After Mitigation

The measures identified in the project design related to animal and disease control would reduce potentially significant impacts to below a level of significance.

b. Reduced Landfill Operations Alternative

Impacts

The impacts associated with this alternative would be identical with the project as proposed relative to this issue.

Mitigation

Mitigation would be the same as required for the proposed action.

Significance After Mitigation

The components of the project design identified above would serve to reduce the potentially significant impacts to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

The impacts associated with this alternative would be identical with the proposed action relative to this issue.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

The measures identified in the project design related to animal and disease control would serve to reduce potentially significant impacts to below a level of significance.

d. No Action Alternative

Impacts

This alternative would avoid the potential augmentation of bird and other animal populations at the Eagle Mountain site and thus avoid impacts related to these populations. However, additional impacts could occur at existing disposal sites within the region potentially served by the project.

Mitigation

No mitigation is required.

Significance After Mitigation

The impact is not considered significant.

5. Worker Safety

Assumption and Assessment Guidelines. The significance level for worker safety is determined by the applicable regulations. These include the 1970 Occupational Safety and Health Act, the Minimum Standards for solid waste handling and disposal (Title 14), and the 1977 Mine Safety and Health Act. Any worker exposure to health and safety hazards would be considered a significant impact.

a. Proposed Action

Impacts

Effects on worker safety involve potential exposure to unsafe material in the solid waste itself, such as nails, glass items, or other sharp objects that can cause injury, and potential acute exposure to any remaining hazardous substances that may be in the solid waste. The activity around the container handling yard and at the working face of the landfill would involve the movement of heavy equipment and materials which also pose a workplace accident potential. Workers at particular risk of injury are the railcar off-loaders, heavy equipment operators, spotters of hazardous wastes, and traffic directors around the active face of the landfill.

The environment around any site of major grading activity is noisy. Workers are typically exposed to noise levels in excess of 90 decibels for long periods during the work day. The odors and localized dust levels within landfill work areas are also unpleasant, if not unhealthful, when experienced for long periods. These aspects of the project present an additional potential impact on worker safety.

After the landfill has been established for a number of years, landfill gas will be generated. If allowed to escape to the air above the working face of the landfill or to concentrate in structures associated with the landfill, the landfill gas can pose an extra hazard to workers. This topic is discussed in more detail in Section IV.D., Air Quality, but the potential hazard to worker health is recognized here.

The impacts related to the landfill are typical of all landfills. The hazards associated with the container handling equipment are typical of several large intermodal transport centers where these types of containers are transferred from ship to rail or rail to trucks. The project combines these hazards from separate activities into a single overall operation, but the individual hazards are fairly well understood and accommodated within their industries.

The railroad and the Eagle Mountain Road right-of-way grants, and the exchange of public and private lands would not have an impact on worker safety.

As part of the operation plan for the project, MRC will develop a standard set of procedures for employee activity in handling containers, moving containers to the landfill working face, emptying containers and spreading refuse, compacting and covering refuse, and all of the other maintenance activities associated with the project. These plans would be developed by MRC principals or employees who are experienced in rail operations, shipping container handling, and landfill operations. They would include detailed job and operation descriptions, an identification of safety equipment and procedures, training requirements, emergency response, and other contingency planning. The safety component of such operating plans is based on routine principles of industrial hygiene: recognition of the hazards and stresses present with a specific job, evaluation of the effects of the hazards, and control of the effects.

The operation of the Eagle Mountain landfill would be similar to other landfill operations, and worker health and safety protection measures are well known. Measures to protect workers from specific hazards, such as noise, local dust, and other items, would include specifications for personal protective equipment—ear plugs, gloves, hard hats, and dust masks, or the provisions of enclosed cabs on certain pieces of heavy equipment, mandatory use of eye shields and gloves for some jobs, and so on. Rotation of worker assignments to provide breaks, away from the more unpleasant work areas, may also be included in the work plan. Adequate supervision must be a component of any safety plan to ensure proper use of control measures and equipment, so they accomplish the tasks for which they were designed. These items which are designed to protect worker safety are requirements for disposal site operations established

Significance After Mitigation

Impacts to worker safety are considered potentially significant under the No Action alternative.

6. Public Safety

Assumption and Assessment Guidelines. The major concern for this issue is the risk accidental spillage of nonhazardous compacted municipal waste poses to public health and safety. Accidents involving container vehicles transporting solid waste material to off-site transfer stations or the landfill site could potentially expose the public to nonhazardous materials. Any risk to public health or safety posed by the accidental spillage of waste would be considered a significant impact.

a. Proposed Action

Impacts

The project itself and the operation of off-site transfer stations to serve the project would not be expected to increase the frequency of accidents involving solid waste transport, when considered in terms of accidents per ton-mile of transport. The emphasis on rail transport would tend to decrease the overall potential for accidents when compared with conventional truck transport of the same amount of solid waste due to the control and maintain rights-of-way in which trains operate. The greater distances to the project site, however, would also tend to increase the accident potential. Accidents must be expected to occur, however, and when they do they would expose the public to any conditions presented by the compacted solid waste.

The major impact of spilled refuse is aesthetic. While there may be sharp objects, broken glass, very small amounts of hazardous substances, and other hazards associated with accidental spills of refuse, these would be confined to a relatively small area. The appearance of spilled refuse is quite unsightly and odors from the refuse may be noticeable, but the material itself presents only minimal hazard to people—a much less hazard than spilled gasoline, flammable or toxic gases, or other chemicals, all of which are commonly transported by trucks and trains. Screening for hazardous wastes at transfer stations would reduce the potential exposure to small quantities of hazardous wastes in the municipal refuse.

Solid waste materials would be transported from the transfer station to the landfill site via rail in closed intermodal transport containers. This procedure would present a health hazard due to an accident only if the containers broke open and spillage occurred. The hazard would exist until the spilled material was removed. In the event an accident occurs along either the Southern Pacific or the Eagle Mountain rail line, the clean-up time would delay the passage of subsequent trains and potentially interrupt the transport of solid waste. The same type of delay would occur with a non-railroad incident, such as an earthquake or flood which washes out a portion of the track.

Hazardous wastes derived from the landfill operation may include paints, fuel oil, and solvents from the maintenance activities; the organic phases from leachate or landfill gas condensate; and small quantities of hazardous materials recovered from the on-site waste inspection facility. These wastes will be periodically removed from the site for delivery to a licensed hazardous waste facility. Transportation of these wastes will be by licensed hazardous waste carriers under manifest as required by state law. Wastes will be segregated and containerized as required by regulations.

Emergency response plans to address major accidents on roadways and rail lines are already in place at the local government level, as part of federal and statewide programs. As a regular carrier of hazardous materials (not including the municipal waste transport proposed by the project), the Southern Pacific rail company is required by state law to have contingency plans in place to respond to spills or accidents. Materials commonly transported by rail along the Southern Pacific line include a variety of petroleum products and flammable liquids, chlorine gas, and other explosive or corrosive substances. Emergency response plans for accidents involving such materials, typically involve the assignment of an emergency response coordinator; the maintenance of equipment to contain and clean up any spilled material; procedures and information for notifying local fire departments, health departments, and other officials involved with public safety; retention of outside contractors to clean up certain types of releases; and other measures. This plan would be implemented by Southern Pacific, its customers who own the materials being transported, the local fire department in the jurisdiction where an accident occurs, and the Riverside County Department of Health, Hazardous Materials Unit. These existing plans should be more than capable of responding to the accidental spillage of nonhazardous compacted municipal waste.

As part of their own emergency response planning, MRC would maintain adequate staff on-site or on call to provide clean-up workers to supplement Southern Pacific workers and to accomplish trash pickup as necessary. This provision, in conjunction with existing response plans, would provide adequate mitigation for the potential increase in accidents.

Rail delivery of refuse to Eagle Mountain is the intended primary means of transportation. It is possible, however, that longer delays in the rail transport system as a result of catastrophic disruption of the rail service could occur. There are several means by which the flow of waste could be handled. There will be a surplus of containers within the system that can be used to load refuse. These could be temporarily stored at the transfer stations or on rail sidings. The maximum length of storage would be limited to a period of time to be established in the emergency response plan that will be approved by the appropriate state or county agency.

Over the life of the project, it is possible that an interruption of rail service might occur as a result of an earthquake, other acts of God, or rail strike. In the event that the rail movement of filled containers is delayed beyond the period permitted, the containers themselves are designed to be used in a variety of transport modes, and they could be shifted from rail transport to truck transport. At full capacity of 20,000 tpd, an additional 650 trucks per day would be required to handle the portion of the refuse normally carried by rail. This additional response would help ensure steady flow of refuse to the Eagle Mountain site or to alternate area landfills depending upon the location of the train disruption. Under emergency conditions, adequate landfill space would be found for deposition of the refuse. It is expected that these occurrences would be infrequent and of short duration; therefore, impacts (noise, air quality, traffic, public safety) would not be significant.

The additional impacts on traffic, air quality, fuel consumption, or other areas can only be determined by assuming specific locations of the rail disruption. Repair of the rail service and resumption of transport by rail at the earliest possible time would, of course, obtain the highest priority.

The railroad right-of-way grant would include the repair and maintenance of the currently unused railroad and the construction of a new railroad spur entering the Phase II container handling yard. The Eagle Mountain Road right-of-way grant would entail the repair and maintenance of a portion of the presently washed out truck road. Maintenance of the rail and road rights-of-way would have a positive impact on the potential for public exposure to nonhazardous waste materials resulting from truck and rail accidents.

The land exchange, consisting of private and public lands, would have no impact on public safety.

Mitigation

The project incorporates measures to minimize public safety impacts such as providing available staff to assist in the removal of spilled waste in the event of an accident. The discretionary actions covered by this draft EIS/EIR do not directly establish conditions for the transfer stations, but the planning measures noted reflect what has been proposed and what would typically be expected in a solid waste facilities permit for a transfer station.

Significance After Mitigation

Implementation of the project design would reduce public safety impacts due to accidental spillage of municipal solid waste to below a level of significance.

b. Reduced Landfill Operations Alternative

Impacts

The possible reduction in the extent of the landfill perimeter would not affect the daily operation of the facility. However, the slight reduction in truck and rail traffic to the site under this alternative would have an incremental decrease in the potential occurrence of truck and rail accidents. The potential impacts to public safety would subsequently have an incremental decrease compared to the proposed action.

Mitigation

Mitigation measures would be the same as with the proposed action.

Significance After Mitigation

This alternative incorporates measures to reduce any potential impacts to public health and safety due to accidental spillage to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

To the extent that truck transport has a higher potential accident frequency than rail transport, this alternative would provide a theoretically safer system. The relatively low hazard posed by accidents, however, and the response capabilities proposed within the project greatly reduce this possible advantage. On the other hand, this alternative would eliminate or reduce greatly the flexibility of the project to respond to interruptions in the availability of rail service. If the container handling yard is designed in a way that does not provide for truck delivery, it would be more difficult to accommodate delays in rail transport caused by accidents or other events.

Mitigation

Mitigation measures would be the same as for the proposed action. Also, the container handling yard would be designed to handle trucks in an emergency.

Significance After Mitigation

This alternative incorporates measures to reduce any potential impacts to public health and safety due to accidental spillage to below a level of significance.

d. No Action Alternative

Impacts

This alternative would avoid any increase in accident potential related to rail and truck transport of solid waste to Eagle Mountain. The increased reliance on local landfill disposal capacity under this alternative would essentially transfer these risks to the more populated regions in the vicinity of existing landfills, thus increasing the population exposure to these risks. Also, as noted above, truck transport has higher potential accident frequency than rail transport. The shorter haul distances involved, however, may result in somewhat fewer accidents.

Under the No Action alternative, modifications to the existing site would not occur. Public access to the unused facilities could cause potential public safety hazards, including exposure to unstable slopes, deep pits, and falling objects. These public safety impacts are considered potentially significant.

Mitigation

No mitigation is required.

Significance After Mitigation

The potential for public safety hazards to occur from the proposed action would not exist, although exposure to the abandoned mining facilities represents a potential significant impact to public safety with no opportunity for mitigation.

C. Traffic and Transportation

The landfill construction and operations, the BLM/Kaiser Steel Resources, Inc., land exchange, the Eagle Mountain rail line and Eagle Mountain Road Extension right-of-way grants, and Riverside County Plan Amendment would not have any significant impacts on traffic and transportation. The following discussion provides a detailed evaluation of the effect of the proposed action on rail operations, at-grade crossings, truck traffic on surface streets, and transfer stations.

1. Rail Operations

Assumptions and Assessment Guidelines. The proposed Eagle Mountain landfill is expected to begin operations in the early 1990s, but it will not be operating at full capacity until at least 1995. The project impacts analysis focuses on 1995, as this is the earliest date at which the full impacts of the project will occur. Conflicts between ongoing regional rail operations and trains serving the landfill would represent a significant impact.

a. Proposed Action

Impact

Existing train traffic volumes in the study area range from less than 10 trains daily to 50 trains per day in the vicinity of Colton. Train traffic along the primary segment, Segment 1 from Eagle Mountain through the Coachella Valley to the Colton Yard/San Bernardino transfer station, ranges from 28 to 50 trains per day, with a median average of 35 trains per day. Train traffic along the secondary segments tended to be significantly lower, ranging from 2 to 35 trains per day.

As part of the development of the Phase I container handling yard, the entire length of the Eagle Mountain rail line right-of-way must be reviewed and granted under current FLPMA, Title V (43 U.S.C. 1761 et seq.) procedures. As shown on Figure 12, a new FLPMA right-of-way would be issued over the entire length of the existing, legislatively approved Eagle Mountain rail line right-of-way from Eagle Mountain to Ferrum Junction.

All trains would switch from the main line to the Eagle Mountain spur at Ferrum Junction. The junction at Ferrum was designed to provide for the transfer of ore trains of similar length from the Eagle Mountain spur line to the Southern Pacific main line. No operational or scheduling problems are expected as a result of switching operations at Ferrum Junction.

The proposed action is expected to be capable of accepting up to six unit trains per day at the container handling yard. To transport the amounts of solid waste from the geographic areas assumed for the analysis, an average of 4.7 shipments per day will be required when the project is operating at full capacity. Based on this description and counting return trips for the trains, an average of 9.4 trains per day will utilize the primary rail segment (with a maximum number of 12 trains per day on a round-trip basis), with fewer trains on each of the secondary segments. Proponents of the proposed action will arrange scheduling of refuse unit trains with Southern Pacific on a contractual basis to prevent any conflict between ongoing rail operations and trains being utilized for the landfill project. Because the volume of rail traffic on the rail lines studied is expected to remain fairly static, at least through 1995, the project-related usage of rail transport is expected to have an insignificant impact on the rail lines and surrounding infrastructure (Kava, 1/1/90).

The offered lands are crossed by or adjacent to the Eagle Mountain rail line. Because these lands are privately owned, a right-of-way grant was not previously required. However, the exchange of the land to BLM ownership would necessitate a railroad right-of-way grant.

Mitigation

No significant impacts have been identified for rail operations under this alternative. However, to avoid potential conflicts between ongoing Southern Pacific rail operations and trains being utilized for the landfill project, refuse-transporting trains will be scheduled by project proponents. No additional mitigation is required.

Significance After Mitigation

The impact of the proposed action to existing rail operations is considered insignificant.

b. Reduced Landfill Operations Alternative

Impact

The reduced landfill operations alternative proposes transporting 14,000 tpd by rail and 2,000 tpd by truck of waste materials from refuse collection routes to a network of truck and rail transfer stations. The truck transfer station would be located in either Riverside or San Bernardino County, approximately 75 miles from the landfill. Because this is a slightly smaller volume of rail traffic, the impact to existing rail operations would be less than the proposed action's and would remain not significant.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

This alternative's impact to existing rail operations is not significant.

c. Proposed Action with Rail Access Only Alternative

Impact

The effects of this alternative would be identical with the reduced landfill operations alternative.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

This alternative's impact to existing rail operations is not significant.

d. No Action Alternative

Impact

Under the No Action alternative, all impacts would be avoided.

Mitigation

None is required.

Significance After Mitigation

No impacts would occur with this alternative.

2. At-Grade Crossings

Assumptions and Assessment Guidelines. The shipments from each transfer station would use one or more of the rail segments previously identified to reach the landfill. Each shipment to the landfill would necessitate two one-way train trips. A shipment of full containers to the site and a return train delivering empty containers for reuse at the transfer station would both be required. This additional train traffic will add to the total daily delay of automobile and truck traffic at at-grade crossings. In assessing the significance of vehicle delay times from the proposed action, this draft EIS/EIR compares system delay totals with single crossing delays at other crossings in the Southland. A hazard index measures the safety at each at-grade crossing. Any substantial delays or increased hazard in automobile and truck traffic at at-grading crossings due to the proposed action would be considered a significant impact.

a. Proposed Action

Impact

An average of 9.4 trains per day will utilize the primary rail segment, with fewer trains on each of the secondary segments. Along the primary segment, the total daily delay adding all of the crossing delays together caused by the passage of these trains on the primary segment will be approximately 11 vehicle hours. The maximum average delay at any one grade crossing along this segment would be between one and two minutes.

Along the secondary segments, the total vehicle delay time caused by the project would be greater, due to the larger number of crossings, the larger traffic volumes, and the generally slower train speeds in the urban areas. The cumulative total of all delays in the secondary segments would be approximately 78 vehicle hours per day. The delays associated with the individual processing and transfer stations would range from 1.39 vehicle hours (San Bernardino County) to 47.65 hours (Orange County).

In assessing the significance of vehicle delay times from potential rail haul waste disposal projects, SCAG compared system delay totals, such as those noted above, with single crossing delays of up to 100 to 300 hours on major arterials near the ports of Los Angeles and Long Beach. For another comparison, on typical arterial intersections with 20,000 daily vehicles on each street, typical stoplight delays amount to 300 vehicle hours per day. On the basis of these comparisons, SCAG characterized the delays caused by trains at grade crossings as "relatively minor" (SCAG 1988:8-4). The effects on delays at grade crossings caused by the Eagle Mountain project would be similar. Because the delays are not substantial, they are not considered a significant impact.

The overall effect of the project on the hazard indices of the at-grade crossings is to increase the values by 10 to 30 percent, without significantly altering the overall rankings of the various at-grade crossings. The reason no major change in the overall rankings of the various at-grade crossings occurs is that the net increases in train traffic resulting from the project, while different for the various rail segments analyzed, tend to be proportional to the expected baseline train traffic on each segment. The forecast increase in background highway traffic volumes between 1989 and 1995 has a much greater effect on the calculated hazard indices for the at-grade crossings analyzed than the project-related increase in train traffic. In a similar manner, yearly fluctuations in train activity also cause changes in the calculated hazard indices. For these reasons, the effect of the project on safety at crossings with surface streets is not considered a significant impact.

To assess the potential hazard for the new crossing proposed on Kaiser Road when the new spur is constructed to serve the Phase II container handling yard, the hazard index for this location was calculated using the future traffic volumes with the project and the full volume of train traffic from the project (see Figure 13). Even with the minimum protection improvements possible (warning signs only), the hazard index at this location would be low when compared with many other typical crossings, so the potential hazard impact at this location would not be significant.

Unlike highway analysis, there is an absence of widely-recognized standards related to the identification of deficiencies in rail operations or safety. The PUC has been contacted regarding this matter, as they are responsible for administering the program related to at-grade crossing improvements. This program is known as the Federal Grade Crossing Program or Section 130 Program. The PUC indicated that adding an increment of five to seven new round trips to a line already carrying 50 trains daily would not cause a significant transportation impact in their eyes, as long as the Southern Pacific did not have any scheduling problems (the Southern Pacific has been contacted and does not foresee any scheduling problems).

In summary, the project-related usage of rail transport is expected to have a minimal effect on the rail lines and surrounding infrastructure. Capacity within the rail system will be available to accommodate the number of shipments made to the landfill. In terms of the number and length of trains involved, the project is similar to the previous rail operations between Eagle Mountain and the Kaiser Steel plant at Fontana. Its overall effect would be similar to that rail transport activity which was suspended in 1983. When operating at maximum daily capacity, the project will average 4.7 shipments of refuse per day, totaling 9.4 trains on a round-trip basis. Throughout the entire transportation system, a total of approximately 78 hours of delay is expected on an average daily basis to vehicles encountering refuse unit trains when using at-grade crossings. Most of this delay would occur on the rail segment servicing northern Orange County, where a combination of high traffic volumes and low train speeds result in much higher delays than along other rail segments. The project is not expected to have a significant impact on safety within the study area, nor will the project significantly affect the ranking of crossings along the primary analysis segment when compared to other crossings included in the safety analysis.

To minimize traffic conflicts, trains would be scheduled to begin their runs starting from the western or southernmost transfer station very late at night, at approximately 11:30 P.M. As the train moved eastward, it would proceed through Banning Pass. Once at Ferrum Junction, cars would be left on the siding to be hauled to Eagle Mountain by MRC locomotives.

Although the safety hazard anticipated at the railroad crossing proposed along Kaiser Road is relatively small, the presence of school children nearby makes the installation of flashing lights at this proposed at-grade crossing highly desirable. MRC will install flashing lights at this location making it one of the lowest-hazard at-grade crossings analyzed.

Mitigation

The impacts of the proposed action to at-grade crossings is considered insignificant, and thus, no mitigation is necessary. However, measures to further ensure the safety of the at-grade crossings such as the installation of flashing lights at rail crossings and scheduling late-hour departures from the western or southernmost transfer stations will be implemented.

Significance After Mitigation

The impact of the proposed action on at-grade rail crossings is considered below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

The reduced landfill operations alternative proposes transporting 14,000 tpd by rail and 2,000 tpd by truck of waste materials from refuse collection routes to a network of truck and rail transfer stations. Because this is a slightly smaller volume of rail traffic, the impact to existing rail operations would be incrementally less than the proposed action's and would not be significant.

Mitigation

Mitigation measures identified for the proposed action would apply to this alternative as well.

Significance After Mitigation

This alternative's impact to at-grade rail crossings is not significant.

c. Proposed Action with Rail Access Only Alternative

Impact

The effects of this alternative would be identical with the reduced landfill operations alternative.

Mitigation

Mitigation measures for this alternative would be the same as identified for the proposed action.

Significance After Mitigation

This alternative's impact to at-grade rail crossings is not significant.

d. No Action Alternative

Impact

Under the No Action alternative, all impacts would be avoided.

Mitigation

None is required.

Significance After Mitigation

No impacts would occur with this alternative.

3. Truck Traffic on Surface Streets

Assumptions and Assessment Guidelines. The proposed landfill will impact the highway system in two primary ways. Approximately 20 percent of the waste delivered to the site will be transported via truck, and the project will also generate new employment at Eagle Mountain, both of which have the potential to impact the highway system adversely in the vicinity of the project. For traffic, significant impacts are defined as landfill-related traffic volumes that cause peak-hour or daily average level of service to decrease by one or more levels.

a. Proposed Action

Impact

Approximately 200 one-way truck shipments per day would be required to deliver the 4,000 tons of refuse anticipated to be delivered to the landfill in intermodal transfer containers or long-haul transfer trucks. The number of truck trips each day is based on the capacity of the intermodal containers that will be used to transport the refuse (20 tons per container) and the amount of waste that is expected to arrive via this mode each day (4,000 tons). It is anticipated that half of this truck-transported waste will come from within Riverside County and the other half from San Bernardino County.

The trucks could arrive at any time of the day, as the container handling yard will be operational 24 hours a day. This would result in an average of just over eight shipments arriving each hour. A more conservative scenario would be the arrival of truck shipments during daylight hours only (12 to 13 hours daily). An average of 16 shipments arriving each hour results from this more conservative assumption. All trucks would be required to use the Eagle Mountain Road Extension via Eagle Mountain Road under normal circumstances for shipment delivery.

The daily traffic volume related to traffic other than the trucks delivering refuse to the site would be slightly less than 500 total daily trips, or 250 inbound and 250 outbound trips. Based on relative population densities, it is estimated that 85 percent of the trips will be to and from the west, while 10 percent of the trips will have origins or destinations to the east and 5 percent travel to and from the north on Desert Center Rice Road. These trips would include both employee travel to and from work and trips made by delivery vehicles, service vehicles, and other traffic to and from the site.

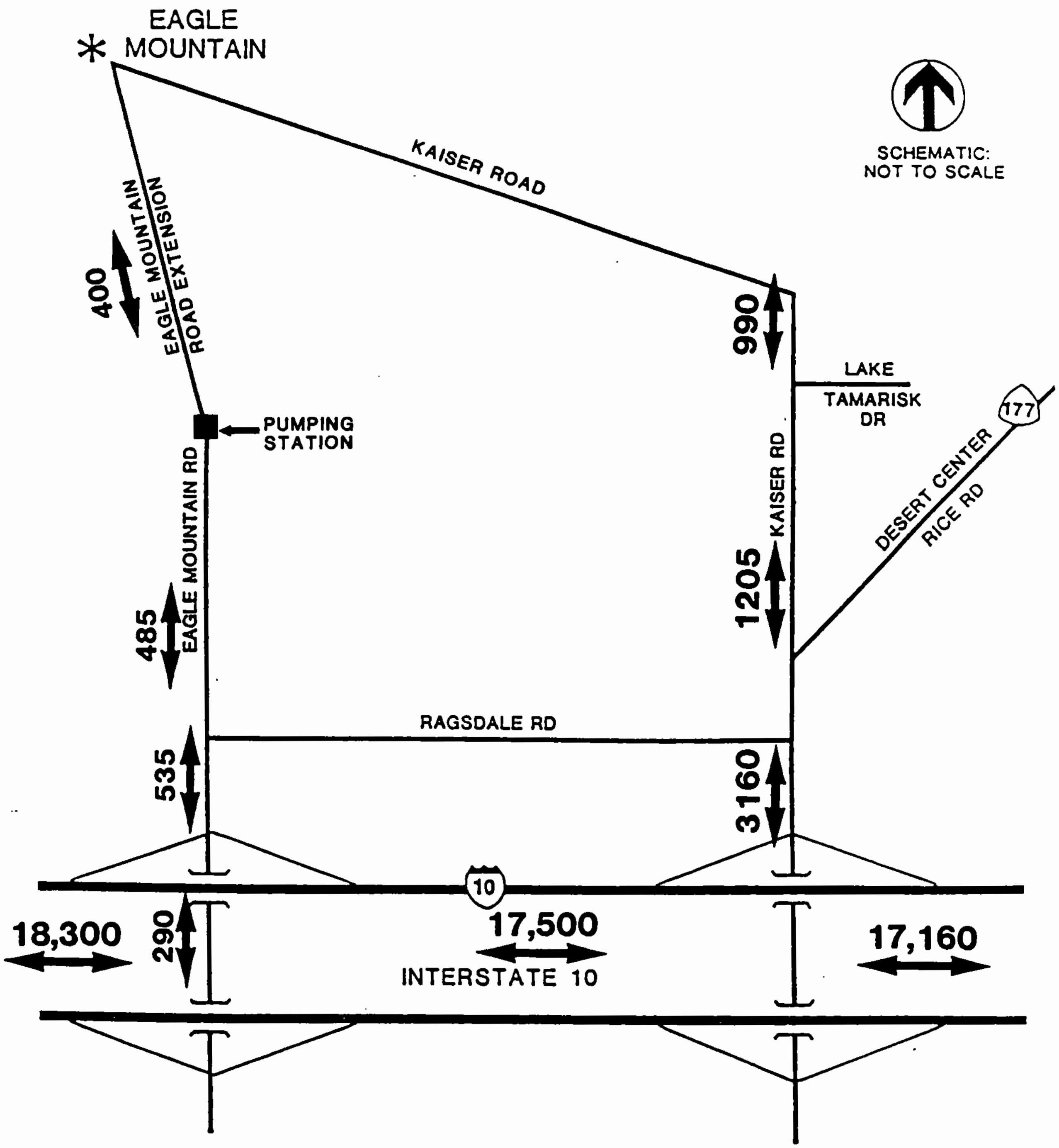
Although long-term relocation of employees would likely result in some trips terminating within the study area, all traffic was conservatively assumed to exit the study area. As a worst-case assumption, all non-truck traffic was assigned to Kaiser Road, maximizing the estimated impacts to this public road. Figure 78, including both truck and other traffic, presents the expected 1995 project buildout condition of daily traffic volumes on study area roadways. Note that the 85 vehicle difference on Eagle Mountain Road north of Ragsdale Road and the pump station reflects the existing traffic observed (65 vehicles per day) factored upwards to reflect background growth.

During the peak hour, 116 trips are expected to enter and exit the site in addition to the previously described truck trips related to the delivery of refuse. A total of 81 trips would leave the site, while 35 vehicles would be entering the site. No significant degradation in operating conditions at the intersections is anticipated as a result of the project-related traffic.

All traffic movements analyzed would continue to operate at LOS A, with minimal delays and no lack of capacity. No significant impacts due to truck traffic on surface streets are anticipated.

The proposed Eagle Mountain Road Extension that would accommodate truck traffic to the site will extend from south of the MWD pumping station approximately one mile northeast along the Kaiser Truck Trail alignment. Then the new road will travel northwest approximately 3,000 feet to near where the Eagle Mountain rail line diverges northwest away from the truck trail. At that point, the road will follow the rail alignment to near where it crosses the California Aqueduct. This segment is in disrepair and would require substantial upgrading. The new road will then head north to the existing main haul road at the mine site, abandoning the remainder of the Kaiser Truck Trail right-of-way. A new right-of-way grant would be required for this road segment. The distance from the pumping station to the proposed permanent container handling yard is approximately 5.4 miles.

The expected impact of the truck traffic associated with the project on I-10 is minimal. A total of 200 round trips on I-10 represents a two percent increase in the overall daily traffic volume



SOURCE: DKS ASSOCIATES, 1990

FIGURE 78. FORECAST 1995 DAILY TRAFFIC WITH PROJECT

RECON

R-2100E 2/90

in the immediate vicinity of the project and a much smaller percentage as traffic volumes on I-10 increase to the west. It is expected that this very minimal increase in truck activity would not impact significantly either weigh stations or rest areas.

The extremely high reserve capacity under existing and projected future conditions at the Eagle Mountain Road exit ramp of I-10 indicates that projected traffic volumes could be 2,000 percent higher before the level of service would degrade to LOS B.

The Eagle Mountain Road Extension will create a new intersection at Kaiser Road. Relative to its capacity, this intersection will carry few vehicles and it could be configured in several different ways. The optimal configuration would be construction as a two-way stop, with the stop signs placed on the lower-volume legs of the intersection, that being Kaiser Road. The traffic volumes on all approaches to this intersection are low enough that the stop signs could instead be placed on the Eagle Mountain Road Extension or the intersection could even be configured as a four-way stop, with stop signs on all four approaches to the intersection. A single truck every two minutes on average is well within the acceptable range for a four-way stop controlled intersection. Regardless of the configuration, LOS A operating conditions would result. Installation of a traffic signal would not be warranted per guidelines developed by Caltrans and is therefore not recommended. No significant impact to existing traffic is anticipated.

Washouts are discussed in the drainage section of this draft EIS/EIR.

Over the life of the project, it is possible that an interruption of rail service might occur as a result of an earthquake, other acts of God, or rail strike. In these cases, it is anticipated that the inability to deliver refuse by rail would be covered by trucks until rail service can be restored. It is expected that such occurrences would be infrequent and of short duration; therefore, the impacts would not be significant.

Mitigation

Degradation of street surfaces due to the weight of trucks carrying refuse loads would be mitigated by County maintenance of Eagle Mountain Road funded by revenue generated by the proposed action on a fair-share basis. The precise improvement and paving configurations will be determined by the County Transportation Department and established as conditions within the landfill specific plan.

Significance After Mitigation

The mitigation measures discussed above lower the proposed action's truck traffic impact on surface streets to below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

The reduced landfill operations alternative proposes transporting 14,000 tpd by rail and 2,000 tpd by truck of waste materials from refuse collection routes to a network of truck and rail transfer stations. Because this is a smaller volume of truck traffic, the impact to surface streets would be less than the proposed action's and would not be significant.

Mitigation

Mitigation is the same as the proposed action.

Significance After Mitigation

This alternative's impact to surface streets would be lowered to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impact

The effects of this alternative would be to eliminate all truck traffic, thereby eliminating any truck impacts to surface streets.

Mitigation

No mitigation would be required.

Significance After Mitigation

This alternative eliminates all truck traffic impact to surface streets; thus, impacts would not be significant.

d. No Action Alternative

Impact

Under the No Action alternative, all impacts would be avoided; however, an increase in truck traffic impacts could occur at other disposal sites within the region.

Mitigation

None is required.

Significance After Mitigation

No impacts would occur with this alternative.

4. Transfer Stations

A total of six transfer stations was identified to serve as locations where refuse would be consolidated and loaded into containers for delivery to the site. These processing and transfer stations are not directly a part of the project but were selected in order to allow the analysis of indirect traffic impacts. They are not analyzed in this report.

D. Air Quality

1. Emissions

Assumptions and Assessment Guidelines. Air quality impacts associated with the project are due to emissions from the following sources:

- Construction and site preparation operations
- Transfer stations
- Solid waste transport
- On-site material handling (except fugitive dust)
- Landfill gas generation and combustion
- Fugitive dust

Emissions from each of the categories of sources were estimated on both a maximum daily and annual basis. Worst-case emission rates were used to avoid underestimating impacts from the project. These emission rates were chosen as representative of currently permittable technology and from test data from similar units in operation. For the train haul scenario, for example, current fuel use and emission data for the Southern Pacific locomotive fleet were obtained, and grade-specific factors were generated through information received from Southern Pacific. Manufacturer test data were gathered from General Electric's files for the locomotives formerly used by Kaiser, and specific fuel factors were computed from analyses of the grade profile from Ferrum Junction to Eagle Mountain. For the landfill gas flares, emission and equipment data from seven landfills tested by the South Coast Air Quality Management District were used to determine average emission rates for similar equipment design. Within the range of dust factors published by the Environmental Protection Agency in AP-42 and various research reports, values at the high end of those considered representative of on-site material and proposed processes were chosen.

There are no generally adopted criteria to define the significance of impacts from emissions associated with a project. Appendix E (Sierra Research 1990:61-69) reviews several approaches to assessing significance. One approach is to accept criteria used for the evaluation of industrial sources of pollution, prior to issuing permits to construct or operate, which rely on the comparison of potential emissions increases to established emissions thresholds. The problem with this approach is that the criteria have been developed for the regulation of point sources of pollution that are subject to direct regulations and permit requirements. Emissions from the project, however, originate primarily from vehicles or mobile equipment sources that are not subject to the point source regulations. Nevertheless, the criteria used for evaluating industrial point sources were used to evaluate the current project.

Appendix E (tables 14-18) reviews the regulatory criteria and thresholds used to evaluate industrial sources. For example, in the areas regulated by the SCAQMD, any new point source emissions are subject to best available control technology (BACT) and emissions above certain thresholds are also required to obtain "offsets," or emission reductions elsewhere in the basin. Table 24 presents some typical regulatory criteria for point sources. Appendix E contains a more thorough tabulation of these thresholds.

a. Proposed Action

Impact

Emissions from the proposed action will be associated with a number of activities. These activities will occur both off-site, such as the operation of urban transfer stations, and on-site, including all of the operations at the Eagle Mountain site. While the off-site emissions are not directly caused by or permitted by the project itself, they are indirectly related to it and are discussed here for that reason. Emissions will involve both stationary sources, such as the landfill gas flares, and mobile equipment, such as the trains hauling waste. By emission type, project sources can be grouped into four classes: motor vehicles, fugitive dust sources, fugitive vapor sources, and stationary combustion sources. Motor vehicles include train locomotives, on-highway haul trucks, and off-highway highway equipment. Fugitive dust sources include short-term construction activities, landfill road use, mine tailing reclamation, and solid waste covering. Fugitive vapor sources include the landfill, and stationary combustion sources include the landfill gas flares.

Motor vehicles will generate "tailpipe" emissions and, in the case of on-site vehicles, fugitive dust from unpaved roads and cover material handling. Processing of daily cover material will produce particulate emissions as ore tailing are reclaimed by screening and crushing. As the refuse begins to decompose, gas will be generated by the anaerobic activity in the landfill. The gas will consist primarily of methane and carbon dioxide with trace concentrations of other substances either produced by the bacterial activity or evaporated from materials disposed of in the landfill. The gas will be collected through a series of underground pipes and will be disposed of by external combustion. The burning of the landfill gas will result in the production of combustion emissions.

Total project emissions from all sources at maximum projected operating levels are shown in Table 25. The emissions are reported in terms of pounds per day and tons per year. These emission levels include controls that the project must incorporate in order to comply with current SCAQMD and EPA emission standards. Each of these sources is discussed in more detail below, in paragraphs that are organized by operations or activities associated with the project.

TABLE 24
SAMPLE THRESHOLDS BASED ON EMISSIONS
FOR POINT SOURCE REGULATION

Agency and Regulation	HC	NO_x	CO	SO_2	PM10
SCAQMD BACT required (lbs./day)	0	0	0	0	0
SCAQMD offsets required (lbs./day)	75	100	550	150	150
SCAQMD/EPA definition of major stationary source					
NSR procedures (tons/yr.)	100	100	100	100	100
PSD procedures (tons/yr.)	25	25	25	25	25
SCAQMD definition of sig. emission increase					
PSD procedures	25	25	25	25	15

SOURCE: Sierra Research 1990:Tables 14-18.

BACT = Best Available Control Technology
NSR = New Source Review
PSD = Prevention of Significant Deterioration

TABLE 25
TOTAL PROJECT AIR EMISSIONS AT
MAXIMUM OPERATION WITHOUT MITIGATION

Activity	Pounds/Day					Tons/Year				
	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Off-site Sources										
Transfer stations	1,780	539	192	162	221	325	98	35	30	40
Trains	10,881	4,399	306	990	1,520	1,986	803	56	181	277
On-Highway Trucks	1,035	489	151	162	212	189	89	27	29	39
Subtotal, Off-site	13,696	5,427	649	1,314	1,953	2,500	990	118	240	356
On-site Sources										
On-site vehicle exhaust	2,821	946	210	167	291	515	173	38	30	53
On-site fugitive dust			766					140		
Landfill gas flares	1,182	816	676	845	310	216	149	123	154	57
Subtotal, On-site	4,003	1,762	1,652	1,012	601	731	322	301	184	110
TOTAL	17,699	7,189	2,301	2,326	2,554	3,231	1,312	419	424	466

SOURCE: Sierra Research 1990:Table 28 (see Appendix E).

Construction Operations. Temporary emissions will be produced during the construction of project facilities. At both on-site and off-site locations, fugitive dust and construction equipment exhaust will be generated. As these emissions will be temporary and, for fugitive dust, readily controllable, they are not considered to be significant.

Some new transfer stations processing and shipping solid waste may be constructed in the SCAB. These sites may require demolition of existing structures, excavation for new foundations, and disturbance of soil areas during construction. Fugitive dust and exhaust emissions from construction equipment will be generated. Soil that is carried out of construction sites and dropped onto paved roads will generate fugitive dust as it is pulverized by vehicle tires and suspended by the air turbulence created by moving vehicles.

In developing the Eagle Mountain facility for the long-term handling of solid waste, a new container handling yard, rail spur, and access road will be constructed. All three facilities will require the placement of significant quantities of structural base aggregate due to the low carrying capacity of desert soils at the site. The transfer and placement of native and imported aggregate will generate fugitive dust and vehicle exhaust emissions for a limited period of time.

Solid waste will be transported from the container handling yard to the active face of the landfill over an internal road system. Portions of this system will be paved, while other portions would have surfaces of packed gravel. Initial construction of this road system will generate fugitive dust and vehicle exhaust emissions for a limited period of time. During the life of the project, the internal road system leading to the working face of the landfill will be periodically moved and reconstructed as the landfill surface rises to cover the roads. Emissions from initial construction were not quantified since they would be short-term in nature and are not considered significant. The emissions from road reconstruction during the life of the project, however, will contribute to total on-site impacts during operation. The fugitive dust emission from this ongoing road maintenance and reconstruction is included within the impacts discussion below.

To periodically check the quality of groundwater under the landfill, monitoring wells will be drilled at the commencement of project operations. Prior to drilling, fugitive dust and exhaust emissions will be generated as a crawler tractor levels pads and the drills are moved into place. During initial drilling of each hole, some dust will be generated as the drill cuts into soil within the first three to five feet below the surface. Fugitive dust and exhaust emissions will also be generated during the construction of the pipelines used to transport leachate to a wastewater pretreatment plant. These construction activities generating fugitive dust and exhaust emissions will involve excavation for project components and disturbance of soil areas from the passage of construction equipment.

To minimize the quantity of rainwater run-on, a network of ditches and pipelines will capture and divert storm water falling in and around the landfill. Construction of this system will generate fugitive dust and exhaust emissions for a limited period of time. During the life of the project, surface ditches will require periodic maintenance to remove sloughed material. Although emissions from initial construction were not quantified, the emissions from maintenance will contribute to total on-site impacts during peak operation and are included within estimates of total fugitive dust from the project.

Prior to project startup, on-site facilities for the inspection of solid waste and storage of recycled components will be constructed. Construction of these facilities will generate fugitive dust and exhaust emissions for a limited period of time.

To comply with South Coast Air Quality Management District Rule 403, standard dust control measures such as prewatering will be used to minimize fugitive dust generated from each of the activities listed above. Water will be obtained from existing wells located at the project site. Control effectiveness will be monitored visually by district inspectors and project supervisors. The application of water to traveled surfaces and exposed soil will be adjusted to maintain very low levels of visible emissions without creating mud. Mud carried off-site and deposited on paved roads will produce fugitive dust when dry.

To summarize, vehicle emissions and fugitive dust associated with short-term construction activities are not considered significant, and no attempt has been made to quantify them. Emissions resulting from ongoing maintenance activities, however, would contribute to the overall emissions of the project and these are included within estimates of the project impacts.

Transfer Stations. During project operation, urban transfer stations will be used to segregate recyclables and hazardous materials and to compact waste components. Refuse destined for recycling may be temporarily stored on-site and periodically shipped to processors. When market demand is low for such materials, recyclables may be shipped to Eagle Mountain. Nonrecyclable waste will be shipped from the transfer stations by rail for ultimate disposal at Eagle Mountain. Each transfer station will be served directly by a rail spur or be located near one. Containerized waste will be transferred by truck to railheads from those stations not directly served by rail.

Emissions are generated at the transfer stations by the operation of on-site vehicles. Diesel-powered construction equipment will be used to load separated waste into compactors, load filled containers onto trucks or railcars, and spot railcars for loading. Where rail sidings are separated from transfer stations, truck and trailer combinations will be used to move containers off-site to railcars.

Emissions from transfer stations are only indirectly related to the project; however, they are included within this analysis for the sake of completeness. Reduction of transfer station emissions is outside of the scope of conditions that can be placed on this project; however, agencies approving the transfer stations can impose mitigation measures. The small reductions which are shown in the mitigation discussion are those that would result from the implementation of anticipated regulatory changes that have not yet taken effect.

Solid Waste Transport. Approximately 80 percent of the solid waste transported to Eagle Mountain will be by train, primarily from the Los Angeles basin, while the remainder will be hauled from central or eastern Riverside County by truck. Both transportation modes will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines.

Southern Pacific will pick up the loaded cars at urban transfer sites and ferry them to a siding near Ferrum Junction, where the Eagle Mountain rail line intersects the main line. Eagle Mountain engines will hook up to the unit trains at Ferrum Junction and transport them to the container handling yard at the landfill facility.

Diesel locomotive emissions vary proportionately with fuel consumption. Fuel consumption is dependent upon the weight of the train being pulled and the vertical grade of the track. Because the transfer station to landfill route carries trains over two passes, fuel consumption and emissions are not constant over each section of the route. Therefore, separate fuel consumption estimates were generated for flat and inclined portions of the route. Also, as locomotives having different emission factors will be used on the Southern Pacific and Eagle Mountain portions of the route, care was taken to apply the appropriate factors to each portion.

It is anticipated that within 75 miles driving distance from the project, the cost of transporting solid waste in containers from transfer stations using tractor-trailers will be less expensive than shipping it by rail. As a result, 200 truck loads per day are anticipated for the project (400 total truck trips, counting the return trips). For purposes of the air quality modeling, it was assumed that 100 trucks will make two trips per day to the project site with 20- to 25-ton loads.

Over the life of the project, it is possible that an interruption of rail service might occur as a result of an earthquake, other acts of God, or rail strike. In these cases, it is anticipated that the inability to deliver refuse by rail would be covered by trucks until rail service can be restored. It is expected that such occurrences would be infrequent and of short duration; therefore, the air quality impact would not be significant.

On-Site Material Handling (except Fugitive Dust). As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment would consume nearly 8,000 gallons of diesel fuel per day. Nearly 30 percent of this fuel would be consumed by the fleet of trucks which will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations.

The disposal of 20,000 tons of solid waste in 20- to 25-ton containers will require 800-840 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 34 trucks will each complete a circuit of loading and dumping every 37 minutes.

In the container handling yard, overhead cranes and container handlers will also operate continuously during peak periods. Cranes will transfer loaded waste containers from railcars and tractor-trailers to container haul trucks and empty containers from returning haul trucks back to railcars and tractor-trailers. For purposes of the air quality analysis, it is assumed that all of this transfer equipment will be powered by diesel engines and generate exhaust emissions during operation.

Another area of concentrated mobile source activity will be the landfill face itself. In the area where final waste deposition occurs, 25 units of construction equipment will operate simultaneously under the maximum project conditions. Crawler tractors will distribute dumped waste to shape the fill, while compactors will roll over the graded surface to develop the desired volume reduction of deposited material. After final compaction of waste, crawler tractors will spread and compact a layer of cover material daily, as required by state law.

Prior to the placement of waste in the mine pit, a liner will be installed as a part of the leachate collection system. The composition and structure of the liner will be directed by the County and by the Regional Water Quality Control Board. It is anticipated that the bulk of liner material will be derived from reclaimed fine tailing created during operation of the former iron mine. This material will be excavated by front-end loader from former settling ponds and possibly fed to a wet mixer (pug mill) for blending with bentonite or other clay binder. Exhaust emissions will be produced by the front-end loader in excavating the tailing, by the pug mill mixer in preparing the liner mixture, by a dump truck in transporting the material to the pit, by a crawler tractor in shaping the material into a constant-thickness blanket, and by a compactor in rolling over the blanket to compress it.

The project will also reclaim coarse tailing on-site to produce cover material for the waste. In this operation, a front-end loader will excavate material from storage piles. The product will be transported by dump truck to the landfill face, where it will be spread and compacted.

A separate fleet of vehicles will be used on-site to maintain the roadways used to transport liner, waste, and cover material. Two water trucks will wet roadway surfaces continuously during landfill operations to mitigate fugitive dust emissions and enhance compaction of surface material. As the main roads providing access to the working face of the landfill will be constructed in part on the landfill surface itself, frequent reconstruction will occur as the surface of the fill rises from the bottom of the pit. Graders will be used to apply new courses to road surfaces. All of these vehicles will generate exhaust emissions in the pit area during the life of the project.

In the excavation of ore by the former mining operation, benches were cut into the pit walls to catch falling rocks and to provide temporary roads for mine vehicles. These benches now harbor significant accumulations of loose rock which limit their ability to provide protection from falling rock to work forces in the lower portions of the pit. To regain a measure of safety, a crawler tractor will be used to push the accumulated loose rock off each bench prior to commencing waste disposal in that portion of pit below. Exhaust emissions from this vehicle will be generated during operation.

Landfill Gas Generation and Combustion. Landfill gas will be formed over time as waste decomposes. In the absence of oxygen, hydrocarbon wastes will break down to form predominantly carbon dioxide and methane. Trace quantities of toxic gases will also be formed by these processes. As discussed in the section on public safety, the landfill gas collection system is assumed to capture approximately 80 percent of the gas generated. Captured gas will be piped to a combustion system for incineration. The remainder of the gas will escape the landfill through the cover layers.

The gas combustion system will initially use flares to burn the landfill gas. The flares will be designed to mix the landfill gas with air and burn it in an open-topped chamber. Auxiliary fuel will be added when the energy content of the landfill gas is too low to maintain combustion.

Most of the data existing on the generation rates of landfill gas come from studies conducted in the SCAB. On the basis of this information, it is estimated that the project will generate between 18,000 and 46,000 cubic feet per minute of landfill gas after 35 years of operation. Current research indicates that landfill gas production rates increase with increased precipitation. Thus, because precipitation rates are lower at the project than in the coastal areas where the landfill test data were collected, the gas generation rate for the project is expected to be at the lower end of the range of historical data. In order not to underestimate project impacts, however, the gas flow rate used in this analysis was that at the upper end of this range.

As the generation rate of landfill gases increases with the increasing age of deposited waste, the economics of recovering energy from the combustion of the gas will become more attractive. At some point during the life of the project, an energy recovery system will be substituted for the flares. The earliest date forecast for conversion is 1999; consequently, the project will be applying for permits to use only flares for landfill gas disposal. If a conversion to energy recovery equipment is proposed in the future, the impacts of that system will be the subject of a supplemental environmental review.

Limited data collected from landfill gas flares in the SCAB show criteria pollutant emissions to vary significantly from flare to flare. These variations are most likely due to differences in construction and operation of the flares and to variations in the mixture of gases generated by each landfill. Standards for flare construction adopted by the SCAQMD in recent years and improvements in combustion technology will reduce some of the emission variability in new flares. In selecting emission factors representative of the flares proposed, data from source tests, SCAQMD regulations, and an equipment manufacturer's guarantee were reviewed.

Trace quantities of toxic gases are contained in landfill gas and will be emitted from the landfill surface and from the gas flares. The data collected by SCAQMD at a number of landfills show concentrations of toxic gases in raw landfill gas to vary widely from site to site. As all of these gases are organic, a sizable fraction of each of them will be incinerated as landfill gas is burned in the flare system. Data from SCAQMD testing indicate that destruction efficiencies in flares for these gases range from 70 percent to over 99 percent, with a majority of tests showing efficiencies above 99.0 percent.

Fugitive Dust. Almost all project activities which involve the use of mobile equipment will generate fugitive dust. Although the solid waste will not be dry enough or have a sufficient fraction of fine material to contribute measurably to particulate emissions, the movement of vehicles over any surface within the project's boundaries will cause air pollution. Material spilled onto paved roads will be ground and suspended by traffic. The surface of unpaved roadways will abrade and become airborne with the passage of vehicles. Fine particles in the fine and coarse tailing will become airborne with the handling of these materials. The overhead cranes in the container handling yard, moving on suspended guideways, are possibly the only items of mobile equipment which will not produce fugitive dust while operating. Although mitigation techniques can significantly reduce particulate emissions from all sources, such emissions cannot be eliminated fully.

The emission rate of fugitive dust from roadway surfaces will be dependent upon a number of roadway and vehicle characteristics. The project would contain both paved and unpaved roads, and vehicles operating within the project would use both types of roadbeds. Research indicates that the mass of fine particles within the loose material on a road surface will be the most significant parameter in the emission equation. This mass tends to be small on paved roads as the asphalt or concrete do not significantly abrade with traffic flow. Instead, the major sources of loose material on paved project road will be material dropped from vehicles previously travelling over bare earth areas, spillage of cover or liner material from haul trucks, tire wear, and dust fallout from nearby sources. In the case of unpaved roads, loose surface material will be generated primarily by the tire friction of passing vehicles on easily eroded soil particles. Material from tire wear, spillage, and dust fallout would also be present on unpaved roads. The grinding action of tire friction will reduce the particle size of loose surface material, whether on paved or unpaved roads, until a point is reached where particles will be readily entrained in the turbulent wakes of passing vehicles.

The characteristics of the passing vehicles will also dictate the amount of PM10 generated with traffic flow. As the entraining forces on surface particles are dependent upon wind velocities generated by passing vehicles, vehicle speed will have a large influence on emission rates. Some surface particles in a vehicle's track will be thrown into the air by the passage of tires over that portion of the roadway. As a result, the number and size of tires on each vehicle will influence emission rates. The volume of traffic on a road surface will have a direct impact on emission rates over time. Finally, as the grinding action of tires is influenced by the pressure of the tires against a road's surface, the weight of each vehicle will have an influence on its fugitive dust emission rate.

In producing suitable material for pit lining and waste covering operations, fine and coarse tailing will be processed on-site. In the production of pit liner, material will be excavated from former settling ponds by front-end loader. As 90 percent of the fine tailing are silt-sized particles, this activity will generate significant emissions if performed unabated. To comply with South Coast Air Quality Management District Rule 403 (Fugitive Dust), this material will be prewatered with a sprinkler system prior to disturbance. Once mixed, the fine tailing are maintained at a moisture content that will eliminate the emission of fugitive dust during the remainder of handling.

Coarse tailing will similarly constitute most, if not all, of the material needed for waste covering operations. A front-end loader will excavate the tailing from a large storage pile. The material will be loaded into haul trucks by a front-end loader and transported to the working face of the landfill. Dumped cover material will be spread and compacted by crawler tractors.

Although excavated coarse tailing may contain some indigenous moisture, water sprays and other controls may be needed to comply with emission limitations. Dust will be generated at each step of processing. Because of the very low fraction of this material which is smaller than one-eighth inch, and because of its low abrasion tendencies, the overall dusting potential of this material is comparatively low. The federal New Source Performance Standard for nonmetallic mineral processing plants requires low opacity emission levels or wet scrubbers. The South Coast Air Quality Management District BACT guidelines recommends baghouses or wet scrubbers for the control of dust from rock crushing facilities. Sierra Research (1990:104-105) estimates that a cost/benefit analysis will conclude that a baghouse system will be required for control of emissions from the coarse tailing processing system. In complying with this standard, emissions from the cone crushers will be maintained at low levels. Nevertheless, some dust will be emitted in transferring crusher product to the temporary stockpile, to haul trucks, and to a dumping area at the landfill face.

Low levels of dust will be emitted through road maintenance activities. As water trucks travel slowly in a continuous pattern of road sprinkling, fugitive dust emissions from this operation will be much lower than those generated by waste or cover material hauling. Also, as road fill will be watered to enhance compaction as it is applied, and as the process of road buildup will be performed by slow-moving equipment, emissions from this activity will remain low in comparison to other project activities.

One project activity producing uncertain fugitive dust emission levels will be the clearing of natural debris from the pit benches. A crawler tractor will push this material off benches as the landfill face moves along the pit walls. As material free falls off each bench, fine particles in that material will become suspended in the air and contribute to pit emissions. As the content of fine particles in the bench debris is not known, it is difficult to forecast the average level of emissions. In this analysis, the bench clearing emission factor was derived from factors reported for crawler tractors operating in surface coal mines although material at coal mines is known to be softer than at the Eagle Mountain site. This results in an overestimate of expected emissions from this activity. Bench debris could be prewatered by truck using the perimeter road system to reduce dust emissions, and this analysis assumed a control efficiency of 30 percent. Because a sizable fraction of dust generated by the falling debris will fall out within the pit, the emission factor chosen has a built-in margin of safety.

Finally, there will be particulate emissions due to windblown fugitive dust from disturbed areas at times when there is no vehicle activity generating fugitive dust. However, these emissions are expected to be negligible, since most disturbed areas will be in regular use (with fugitive dust emissions accounted for elsewhere) or will be regularly treated or both.

Mitigation Measures

Appendix E (Sierra Research 1990:105-124) includes a thorough discussion of potential mitigation measures and their feasibility. The measures presented below include all feasible measures identified. In the numerical calculations of project impacts, controls required by current regulations have been considered part of the project design and have not been counted as mitigation measures. Measures which are responsive to regulations which have not yet taken effect or which are anticipated in future regulations are presented here, as well as those measures which are beyond current regulatory requirements. Measures which are outside the jurisdiction of the lead agencies are reviewed to address significant cumulative air quality impacts.

Truck Emission Standards. Trucks used to haul solid waste to the transfer stations and trucks used to haul solid waste to the landfill shall comply with all applicable California motor vehicle pollution control regulations. All new trucks used to haul solid waste to the landfill and purchased after the effective date of new, more stringent California motor vehicle pollution control regulations shall comply with those regulations.

Diesel Fuel Quality. Trucks used to haul solid waste to the transfer stations and trucks used to haul solid waste directly to the landfill shall use diesel fuel which complies with all applicable California Air Resources Board regulations for on-highway diesel motor vehicle fuel.

SCAQMD Smoke Enforcement Program. Trucks used to haul solid waste to the transfer stations and trucks used to haul solid waste to the landfill shall be subjected to random checks for excessive smoke by the California Highway Patrol.

California Highway Patrol Diesel Truck Inspection Program. Trucks used to haul solid waste to the transfer stations and trucks used to haul solid waste to the landfill shall be subjected to periodic checks for excessive smoke and emissions control system tampering at California Highway Patrol weight and safety inspection stations.

State Low Emission Vehicle Regulations. Trucks used to haul solid waste to the transfer stations and trucks used to haul solid waste to the landfill shall be low emission vehicles as defined in state regulations, to the extent required by regulations of the California Air Resources Board and the South Coast Air Quality Management District (such as proposed Rule 1601).

Locomotive Operating Procedures. Mine Reclamation Corporation shall ensure that diesel locomotives on the Eagle Mountain railway are shut down when the engines will not be needed for one hour or more. MRC shall ensure that diesel locomotives on the Eagle Mountain railway receive regular preventive maintenance, in accordance with the engine manufacturers' recommendations. This maintenance will include daily visual checks for excessive smoke by the engineers and smoke measurements with an end-of-stack opacity meter of each engine at each scheduled maintenance interval and at each unscheduled maintenance event. Locomotives which are observed to have excessive opacity, in excess of 20 percent, shall be adjusted and/or repaired within three working days of the observation or removed from service. A record of all visual and instrument checks for excessive smoke, as well as associated repairs, shall be maintained by MRC along with the routine maintenance logs for each engine.

Diesel Fuel for Locomotive Operations. All diesel locomotives on the Eagle Mountain railway shall be fueled with diesel fuel which meets the requirements of the ARB for on-highway motor vehicle diesel fuel. MRC shall maintain a record of all diesel fuel purchases which includes a statement by the supplier that the fuel complies with this requirement.

Diesel Locomotive Emission Standards. All diesel locomotive engines purchased for use on the Eagle Mountain railway shall comply with all applicable state and federal emission control requirements.

Electrification of the Eagle Mountain Railway. When landfill gas generation is sufficient to warrant the construction of an energy recovery facility at the project site, MRC shall prepare, or have prepared, a study of the cost/effectiveness of electrifying the Eagle Mountain railway to reduce emissions from locomotive emissions.

Landfill Equipment Operating Procedures. Mine Reclamation Corporation should ensure that equipment operators at the landfill shut down their engines if the equipment will be idle for 15 minutes or longer. MRC should schedule the number of machines and operators to match the anticipated waste volumes and should match the number of container haulers to the container handling capacity to avoid excessive queueing.

MRC should ensure that diesel-fueled equipment at the landfill receive regular preventive maintenance, in accordance with the engine manufacturers' recommendations. This maintenance should include daily visual checks for excessive smoke by the operations or maintenance staff. Equipment which is observed to have excessive opacity, in excess of 20 percent, shall be adjusted and/or repaired within three working days of the observation or be removed from service. A record of all visual and instrument checks for excessive smoke, as well as related repairs, shall be maintained by MRC along with the routine maintenance logs for each item of equipment.

Diesel Fuel for Landfill Equipment. All diesel-fueled equipment at the landfill should be fueled with diesel fuel which meets the requirements of the ARB for on-highway motor vehicle diesel fuel. MRC should maintain a record of all diesel fuel purchases which includes a statement by the supplier that the fuel complies with this requirement.

On-Highway Engines for Landfill Equipment. Prior to purchasing any diesel-fueled equipment for operation at the landfill, MRC shall evaluate the feasibility of purchasing the equipment with engines which are certified by the ARB for use in on-highway trucks. If such engines are available, MRC shall purchase the equipment with equivalent on-highway engines, unless (1) there is no suitable engine available or (2) the mounting and installation requirements, or duty cycle limitations, make it infeasible to use available on-highway engines in that equipment.

Low NOx Engine Design for Landfill Equipment. For any diesel-fueled landfill equipment for which there are no suitable on-highway equivalent engines, MRC shall purchase the equipment with engines which are equipped with turbochargers and intercoolers (or after-coolers). In addition, MRC should maintain these engines with the fuel injection timing retarded to a level recommended by the engine manufacturer for reduced NOx emissions, but which will not result in excessive visible smoke emissions.

Construction Equipment Emission Standards. Mine Reclamation Corporation shall ensure that all landfill equipment which it purchases complies with all applicable federal and state emission control standards.

Electrification of Landfill Equipment. MRC shall purchase and operate electric versions of as many of the following equipment items as is feasible, in lieu of diesel (or other) fueled versions at the landfill site:

- Container loading/unloading cranes
- Pug mills used for liner material preparation
- Crushers used for daily cover or construction material preparation
- Conveyors for transporting cover material 75% of the distance from the preparation area to the landfill face.

Control of Flare Emissions. When the flare gas generation rate exceeds five million cubic feet per day, MRC shall conduct an analysis of the technical and economic feasibility of recovering energy from the flared landfill gas. If the analysis indicates that energy recovery is feasible, MRC shall take the steps necessary to design, permit, and construct the energy recovery facilities before the landfill gas generation rate exceeds 10 million cubic feet per day.

If the analysis indicates that energy recovery is not feasible and the landfill gas generation rate exceeds eight million cubic feet, MRC shall take the steps necessary to retrofit an oxidation catalyst system or other type of control system to the flares which is capable of achieving at least an 80 percent reduction in carbon monoxide emissions and a 50 percent reduction in non-methane hydrocarbon emissions. The control system shall be installed and operating before the landfill gas generation rate exceeds 10 million cubic feet per day.

If an energy recovery facility is not constructed and the landfill gas generation rate exceeds 45 million cubic feet per day, MRC shall take the steps necessary to retrofit a urea injection system (or equivalent system) capable of achieving at least a 30 percent reduction in oxides of nitrogen emissions. The urea injection system shall be installed and operating before the landfill gas generation rate exceeds 50 million cubic feet per day.

In the event that either an oxidation catalyst system or urea injection system is not commercially available for landfill gas control application at the necessary time, MRC shall submit revised applications to the air pollution control agencies reflecting the higher carbon monoxide and non-methane hydrocarbon emission rates from the flares.

Temporary Road Surfaces. Temporary road surfaces will include those used during construction operations, the landing areas from which the container handling trucks will dump, and similar roads. MRC shall apply water as a dust suppressant to all unpaved road surfaces used during construction operations sufficient to maintain nominal surface moisture contents above four percent. In addition, for all unpaved road surfaces or staging areas which are used during normal project operations for a period of 30 days or less, MRC shall apply water as a dust suppressant sufficient to maintain nominal surface moisture contents above four percent.

Transitional Road Surfaces. Transitional roads are those which would be used over periods longer than 30 days but which would periodically be moved or reconstructed. The major transitional road would be the landfill circumference road which would be moved as it becomes covered with deposited material. For all such road surfaces, MRC shall apply chemical dust suppressants on a base of compacted coarse tailing to minimize fugitive dust emissions. The chemical dust suppressant shall be selected based on a field evaluation of candidate suppressants conducted upon startup of the project.

Permanent Road Surfaces. MRC shall pave all on-site roads which will be fixed in their locations for the life of the project. Such permanent roads include the Eagle Mountain Road

Extension, interior roads within the Phase II container handling facility, and the main interior haul road between the Phase II container handling facility and the landfill area. These roads shall be periodically cleaned with mechanical sweepers to minimize the buildup of loose surface material.

Tailing Excavation. Mine Reclamation Corporation shall pre-water tailing piles prior to excavation.

If necessary and effective, MRC shall apply water as a dust suppressant to processed coarse tailing prior to their loadout into haul trucks.

Miscellaneous Fugitive Dust Sources. MRC shall apply water as a dust suppressant prior to clearing material from pit benches, prior to excavating landfill gas collection pipe ditches, during reconstruction of transitional roads, and during any other operations which could result in visible fugitive dust emissions which can be seen from locations outside the project boundary.

Table 26 shows the overall effect of the mitigation measures noted above. As shown in the table, the mitigation measures have the greatest benefits for reducing emissions of oxides of nitrogen and sulfur dioxide. The oxides of nitrogen reductions are due to the use of low NOx emitting engines in locomotives under control of MRC and on-site landfill equipment, as well as the electrification of portions of the operation. The NOx reductions associated with the use of a urea injection system on the flare at maximum flare gas production levels are not shown as a credit in these tables, since they have been incorporated into the project design and are reflected in all estimates of project emissions. This is because it is anticipated that this level of control will be required by regulation.

The sulfur dioxide reductions are due to the use of ultra-low-sulfur fuel in all diesel-burning equipment owned by MRC. The use of this fuel results in associated reductions in particulate matter emissions as well. The use of an electric conveyor to transfer cover material for a portion of the distance which would otherwise be traveled by trucks on transitional roads results in a further reduction in particulate emissions.

In addition, the project design reflects substantial reductions (up to 95 percent) in particulate emissions due to a variety of dust suppression techniques, since it is likely that these measures would be required in order to comply with SCAQMD conditions. These include the use of baghouses on point sources of dust, such as crushers to prepare cover material. Consequently, all estimates of project emissions (with and without mitigation) reflect these reductions.

Relatively small reductions in carbon monoxide and volatile organic compounds (hydrocarbons) are expected beyond those already included in the project design to ensure that flare gas emissions of that pollutant do not exceed applicable regulatory trigger levels. The remaining

TABLE 26
EFFECT OF MITIGATION MEASURES ON TOTAL PROJECT EMISSIONS

Activity	Emissions - Tons/Year (with Mitigation)				
	NO_x	CO	PM10	VOL	SO_2
Off-site Sources					
Transfer stations	325(252)	98(109)	35(22)	30(23)	40(20)
Trains (basin to Ferrum Junction)	1,482(nc)	600(nc)	35(nc)	102(nc)	188(nc)
Trains (Ferrum Junction to Eagle Mtn.)	504(294)	203(nc)	21(17)	79(nc)	89(9)
On-highway trucks	189(nc)	89(nc)	27(nc)	29(nc)	39(nc)
Total off-site sources	2,500(2,217)	990(1,001)	118(101)	240(233)	356(256)
On-site Sources					
Vehicle exhaust	515(292)	173(130)	38(18)	30(19)	53(9)
Fugitive dust			140(125)		
Landfill gas flares	216(nc)	149(nc)	123(nc)	154(nc)	57(nc)
Total on-site sources	731(508)	322(279)	301(266)	184(173)	110(66)
TOTAL	3,321(2,725)	1,312(1,280)	419(307)	424(406)	466(322)

nc = no change

SOURCE: Sierra Research 1990:Tables 28, 34, and 35 (see Appendix E).

sources of carbon monoxide and VOCs are diesel engines, which have inherently low levels of these pollutants..

The following measures are not considered to be feasible at the present time. A brief explanation of why these measures are not considered feasible is provided. More thorough discussion of these topics is provided in Appendix E.

- Use of catalytic trap-oxidizers on new or existing diesel locomotives.

The technology for this type of control system is not yet available for diesel locomotive engines (Sierra Research 1990:112).

- Use of selective catalytic reductions systems on new or existing diesel locomotives

While this type of NOx control system is being used experimentally on some fixed engine applications, the technology is not yet feasible for diesel locomotives (Sierra Research 1990:113-115).

- Use of alternative fuels such as methanol, LPG, or compressed natural gas in diesel locomotives.

At the present time, no locomotive engines using these fuels are available commercially. Modifications to diesel engines to allow the use of natural gas as a fuel would involve either the development of dual fuel engines or the use of spark ignition in diesel engine equipment. Use of natural gas would require fuel tanks two to five times the size of current diesel tanks for the equivalent energy storage. The matter of alternate fuels for diesel locomotives is discussed further by Sierra Research (1990:115-116).

- Use of catalytic trap oxidizers on new diesel-fueled landfill equipment.

At the present time, there are no commercially available catalytic trap oxidizer systems that have been manufactured for use in landfill equipment (Sierra Research 1990:120).

- Use of alternative fuels such as methanol, LPG, or compressed natural gas in new diesel-fueled landfill equipment.

At the present time, commercially available engines using methanol or natural gas do not have sufficient power ratings to meet the requirements for the on-site landfill equipment. While this measure may be practical in the future, particularly after the development of new engines in response to future ARB low emission vehicle regulations, it is not presently feasible (Sierra Research 1990:120).

- Electrification of railway operations.

This measure is one of the principal locomotive emissions control measures now under consideration by the Locomotive Emissions Advisory Committee and ARB. If adopted, this measure would affect railroad main lines throughout southern California. The feasibility of this measure for the Eagle Mountain rail line between Ferrum Junction and Eagle Mountain would be lower because of the steep grades and several major turns in the rail line. These characteristics would prevent the potential advantages of all electric locomotives from being realized and, thus, would make it more difficult to justify the increased costs of all electric locomotives (approximately double the costs of diesel-electric locomotives). In addition, the costs and physical disturbance necessary for the installation of the catenary cable power system reduce the feasibility of this measure. Continued review of the feasibility of this measure is incorporated into the mitigation measures listed above.

- Electrification of all landfill equipment operations.

The degree to which this measure can be incorporated into the project is unknown at the present time. While some of the equipment—conveyor belts and other semistationary machinery—will most likely be electric, other vehicles and large pieces of equipment may require a mobility that cannot be served by electrical power. This measure would not be feasible for all equipment used on the site (Sierra Research 1990:121), but the mitigation measures require that the use of all-electric equipment be maximized.

However, should any of these technologies be required by applicable federal, state, or local regulations, MRC would take steps to comply with these regulations as expeditiously as possible. Given the duration of the project, the application of some of the above technologies is likely, but it is not possible to predict which additional control measures may be required at what point in time.

Significance After Mitigation

Emissions from the project, even after the application of feasible mitigation measures, would still exceed most thresholds which are used to determine regulatory actions over point sources. While these thresholds do not apply to the vehicle exhaust and fugitive dust sources on the project site, their use in this evaluation indicates that the project emissions would exceed those of most regulated point sources. The project air emissions would, therefore, remain a significant impact after the mitigation is implemented.

b. Reduced Landfill Operations Alternative

Impacts

Total emissions from all sources under the reduced operations alternative at maximum projected operating levels are shown in Table 27. The emissions are reported in terms of pounds per day and tons per year. These emission levels include controls that the project must incorporate to comply with SCAQMD and EPA emission standards. The following discussion details regarding the reduced operations alternative emission impacts.

Construction Operations. The emissions associated with construction of the reduced operations alternative will be the same as those described above for the proposed action.

Transfer Stations. The basic transfer station operations under the reduced operations alternative would be the same as those for the proposed action. Equipment activity rates, emission factors, and daily emissions for a typical transfer station will be the same as those discussed previously for the proposed action. However, for this analysis under the reduced operations alternative, only five transfer stations were assumed.

Solid Waste Transport. Under the reduced pperations alternative, solid waste will be transported to Eagle Mountain by two modes: trains and trucks. Approximately 88 percent of the waste will be transported by train, primarily from the Los Angeles basin, while the remainder will be hauled from central or eastern Riverside County by truck. Waste will arrive at Eagle Mountain in 20- to 25-ton containers compacted at urban transfer sites. Both transportation modes will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines.

The configurations of trains and trucks will be the same under the reduced operations alternative as described above for the proposed action; however, fewer train and truck deliveries would occur. Under the reduced operations alternative, 2,000 tpd of waste will be transported to the project site by on-highway trucks. It is anticipated that within 75 miles driving distance from the project, the cost of transporting solid waste in containers from transfer stations using tractor-trailers will be less expensive than shipping it by rail. As a result, 100 truck loads per day are anticipated for the project (200 total truck trips, counting the return trips). For purposes of the air quality modeling, it was assumed that 50 trucks will make two trips per day to the project site with 20- to 25-ton loads.

On-Site Material Handling (except Fugitive Dust). As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment under this alternative would consume nearly 6,600 gallons of diesel fuel per day. About 28 percent of this fuel would be consumed by the fleet of trucks which

TABLE 27
REDUCED OPERATIONS ALTERNATIVE
TOTAL PROJECT EMISSIONS WITHOUT MITIGATION

Activity	Pounds/Day					Tons/Year				
	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Off-site Sources										
Transfer stations	1,139	369	127	112	150	208	67	23	20	27
Trains	9,521	3,849	267	867	1,330	1,738	702	49	158	243
On-Highway Trucks	518	245	75	81	106	94	45	14	15	19
Subtotal, Off-site	11,178	4,463	469	1,060	1,586	2,040	814	86	193	289
On-site Sources										
On-site vehicle exhaust	2,352	789	175	140	242	429	144	32	26	44
On-site fugitive dust			630					115		
Landfill gas flares	1,182	816	676	845	310	216	149	123	154	57
Subtotal, On-site	3,534	1,605	1,481	985	552	645	293	270	180	101
TOTAL	14,712	6,068	1,950	2,045	2,138	2,685	1,107	356	373	390

SOURCE: Sierra Research 1990:Table 48 (see Appendix E).

will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations.

At the peak of landfill activity, container haul trucks will be in almost constant motion. The disposal of 16,000 tons of solid waste in 20- to 25-ton containers will require 640-800 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 26 trucks will each complete a circuit of loading and dumping every 24 minutes.

All other sources of emissions associated with on-site material handling would be the same as those described previously for the proposed action. However, the level of emissions from these activities would be reduced under the reduced operations alternative.

Landfill Gas Generation and Combustion. Estimates of landfill gas generation and associated emissions impacts are the same for the reduced operations alternative as for the proposed action.

Fugitive Dust. Fugitive dust emissions from the reduced operations alternative involve the same types of activities as discussed above for the proposed action, but will occur to a lesser degree.

Mitigation Measures

The same mitigation measures recommended for the proposed action are recommended as well for the reduced operations alternative. Twenty-one measures are discussed above under the proposed action mitigation section. These measures would have benefits similar to those discussed for the proposed action. Table 28 provides a summary of the effectiveness of these mitigation measures. Additional measures which are not considered feasible are the same as those described above for the proposed action.

Significance After Mitigation

Emissions from the reduced operations alternative, even after the application of feasible mitigation measures, would still exceed most thresholds which are used to determine regulatory actions over point sources. As with the project proposed, the air emissions from this alternative would remain a significant impact after the mitigation is implemented.

TABLE 28
REDUCED OPERATIONS ALTERNATIVE EFFECT OF MITIGATION MEASURES ON TOTAL PROJECT EMISSIONS

Activity	Emissions - Tons/Year (with Mitigation)				
	NO_x	CO	PM10	VOL	SO_2
Off-site Sources					
Transfer stations	208(165)	67(72)	23(16)	20(16)	27(15)
Trains (basin to Ferrum Junction)	1,297(nc)	525(nc)	30(nc)	89(nc)	165(nc)
Trains (Ferrum Junction to Eagle Mtn.)	441(294)	177(nc)	19(15)	69(nc)	78(8)
On-highway trucks	94(nc)	45(nc)	14(nc)	15(nc)	19(nc)
Total off-site sources	2,040(1,813)	814(819)	86(75)	193(189)	289(207)
On-site Sources					
Vehicle exhaust	429(244)	144(109)	32(15)	26(19)	44(8)
Fugitive dust			115(103)		
Landfill gas flares	216(nc)	149(nc)	123(nc)	154(nc)	57(nc)
Total on-site sources	645(460)	293(258)	270(241)	180(170)	101(65)
TOTAL	2,685(2,273)	1,107(1,077)	346(316)	373(359)	390(272)

nc = no change

SOURCE: Sierra Research 1990:Tables 48, 50, and 51 (see Appendix E).

c. Proposed Action with Rail Access Only Alternative

Impacts

Emissions from the rail access only alternative will be associated with the same activities as the proposed action, although to a lesser extent, but would exclude those from truck delivery activities. Total emissions from all sources under the rail access only alternative at maximum projected operating levels are shown in Table 29. The emissions are reported in terms of pounds per day and tons per year. These emission levels include controls that the project must incorporate to comply with SCAQMD and EPA emission standards.

Construction Operations. The emissions associated with construction of the rail access only alternative will be the same as those described above for the proposed action.

Transfer Stations. The basic transfer station operations under the rail access only alternative would be the same as those described in above for the proposed action, with the exception of the Riverside/San Bernardino truck station. Equipment activity rates, emission factors, and daily emissions for a typical transfer station would be the same as those shown for the proposed action. Under this alternative, only six transfer stations will be needed.

Solid Waste Transport. Under the rail access only alternative, solid waste will be transported to Eagle Mountain only by trains. Waste will arrive at Eagle Mountain in 25-ton containers compacted at urban transfer sites. Rail transportation will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines. The configurations of trains will be the same as under the proposed action. Fuel use and emissions for train operations under the rail access only alternative would be the same as for the proposed action.

On-Site Material Handling (except Fugitive Dust). As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment would consume nearly 6,600 gallons of diesel fuel per day. Nearly 28 percent of this fuel would be consumed by the fleet of trucks which will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations.

At the peak of landfill activity, container haul trucks will be in almost constant motion. The disposal of 16,000 tons of solid waste in 25-ton containers will require 640 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 26 trucks will each complete a circuit of loading and dumping every 24 minutes.

TABLE 29
RAIL ACCESS ONLY ALTERNATIVE
TOTAL PROJECT AIR EMISSIONS WITHOUT MITIGATION

Activity	Pounds/Day					Tons/Year				
	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Off-site Sources										
Transfer stations	1,576	488	172	148	200	288	89	31	27	37
Trains	10,881	4,399	306	990	1,520	1,986	803	56	181	277
On-Highway Trucks	0	0	0	0	0	0	0	0	0	0
Subtotal, Off-site	12,457	4,887	478	1,138	1,720	2,274	892	87	208	314
On-site Sources										
On-site vehicle exhaust	2,352	789	175	140	242	429	144	32	26	44
On-site fugitive dust			630					115		
Landfill gas flares	1,182	816	676	845	310	216	149	123	154	57
Subtotal, On-site	3,534	1,605	1,481	985	552	645	293	270	180	101
TOTAL	15,991	6,492	1,959	2,123	2,272	2,919	1,185	357	388	415

SOURCE: Sierra Research 1990:Table 59 (see Appendix E).

All other sources of emissions associated with on-site material handling would be the same as those described previously for the proposed action. However, the level of emissions from these activities would be somewhat lower under the rail access only alternative .

Other combustion emissions sources under the rail access only alternative would be the same as those described above for the reduced operations alternative.

Landfill Gas Generation and Combustion. Estimates of landfill gas generation and associated emissions impacts are the same for the rail access only alternative as for the proposed project.

Fugitive Dust. Fugitive dust emissions from the rail access only alternative involve the same types of activities as discussed in above for the reduced operations alternative.

Mitigation Measures

The same mitigation measures recommended for the proposed action are recommended for the rail access only alternative. Twenty-one measures are discussed above under the proposed project mitigation section. These measures would have benefits similar to those discussed for the proposed action. Table 30 provides a summary of the effectiveness of these mitigation measures. Additional measures which are not considered feasible are the same as those described above for the proposed action.

Significance After Mitigation

Emissions from the rail access only alternative, even after the application of feasible mitigation measures, would still exceed most thresholds which are used to determine regulatory actions over point sources. As with the project proposed, the air emissions from this alternative would remain a significant impact after the mitigation is implemented.

d. No Action Alternative

Impacts

The No Project alternative assumes that southern California's landfill needs will continue to be met through use of existing landfills and by providing additional capacity at existing landfills within the SCAB. Under this alternative, truck traffic associated with residential and commercial waste pickups would be identical with that associated with the Eagle Mountain project. (These impacts were assumed to be identical for all cases and thus were not quantified.) In addition, it was assumed that there would be a slight increase in truck travel distances to transfer stations and landfills. This increase in truck traffic was based on the following estimates of replacement and expanded landfill capacity:

TABLE 30
RAIL ACCESS ONLY ALTERNATIVE
EFFECT OF MITIGATION MEASURES ON
TOTAL PROJECT EMISSIONS

Activity	Emissions - Tons/Year (with Mitigation)				
	NO_x	CO	PM10	VOL	SO_2
Off-site Sources					
Transfer stations	288(225)	89(98)	31(20)	27(21)	37(19)
Trains (basin to Ferrum Junction)	1,482(nc)	600(nc)	35(nc)	102(nc)	188(nc)
Trains (Ferrum Junction to Eagle Mtn.)	504(294)	203(nc)	21(17)	79(nc)	89(9)
On-highway trucks	0	0	0	0	0
Total off-site sources	2,274(2,001)	892(901)	87(72)	208(202)	314(216)
On-site Sources					
Vehicle exhaust	429(244)	144(109)	32(15)	26(16)	44(8)
Fugitive dust			115(103)		
Landfill gas flares	216(nc)	149(nc)	123(nc)	154(nc)	57(nc)
Total on-site sources	645(460)	293(258)	270(241)	180(170)	101(65)
TOTAL	2,919(2,461)	1,185(1,159)	357(313)	388(372)	415(281)

nc = no change

SOURCE: Sierra Research 1990:Tables 59, 60, and 61 (see Appendix E).

Estimated Additional Quantity Round Trip

Origin of Waste Material	Tons/Day	Distance
Orange County	2,000	0 miles
Riverside County	2,000	0 miles
San Bernardino County	2,000	60 miles
San Gabriel Valley	7,000	0 miles
Central LA/SF Valley	5,000	20 miles
Weighted Average	18,000	12.2 miles

For this case, no use of rail was assumed. With respect to waste handling equipment at landfills, emissions were assumed to be associated with landfill face operations; cover excavation, hauling, and daily application; and road maintenance. Landfill gas generation was conservatively assumed to be the same as the amount estimated for the Eagle Mountain project, although the higher moisture levels and rainfall in the SCAB would be expected to result in more landfill gas generated for each ton of waste buried. Compliance with applicable dust control regulations and best available control technology was assumed for this alternative; however, the use of advanced controls to reduce flare emissions was not assumed, as existing flares (or other gas disposal equipment) currently in place at smaller landfills would be used under the No Project alternative. The emissions associated with this alternative are summarized in Table 31.

Mitigation

None is available with this alternative.

Significance After Mitigation

Just as with the proposed project and other alternatives, emissions from the No Project alternative would still exceed most thresholds which are used to determine regulatory actions over point sources. As with the project proposed, the air emissions from this alternative would also be considered a significant impact.

e. Comparison of Alternatives

A comparison of the emissions associated with each of the four project alternatives is shown in Figures 79-88 for each of the criteria pollutants. Figures 79-83 show the contributions of each source to the overall total emissions for each pollutant type. For each project alternative with mitigation measures included, the distribution of pollutant totals between the two air basins is also indicated. Figures 84-88 provide additional information regarding the distribution of pollutant totals between the two air basins under the various scenarios analyzed.

TABLE 31
NO PROJECT ALTERNATIVE
TOTAL PROJECT EMISSIONS WITHOUT MITIGATION

Activity	Pounds/Day					Tons/Year				
	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Transfer stations	1,780	539	192	162	221	325	98	35	30	40
Trains	0	0	0	0	0	0	0	0	0	0
On-Highway Trucks	337	159	49	53	69	61	29	9	10	13
On-site vehicle exhaust	1,722	615	134	111	175	314	112	24	20	32
On-site fugitive dust			721					132		
Landfill gas flares	1,689	8,164	676	1,689	310	308	1,490	123	308	57
TOTAL	5,528	9,477	1,772	2,015	775	1,008	1,729	323	368	142

SOURCE: Sierra Research 1990:Table 67 (see Appendix E).

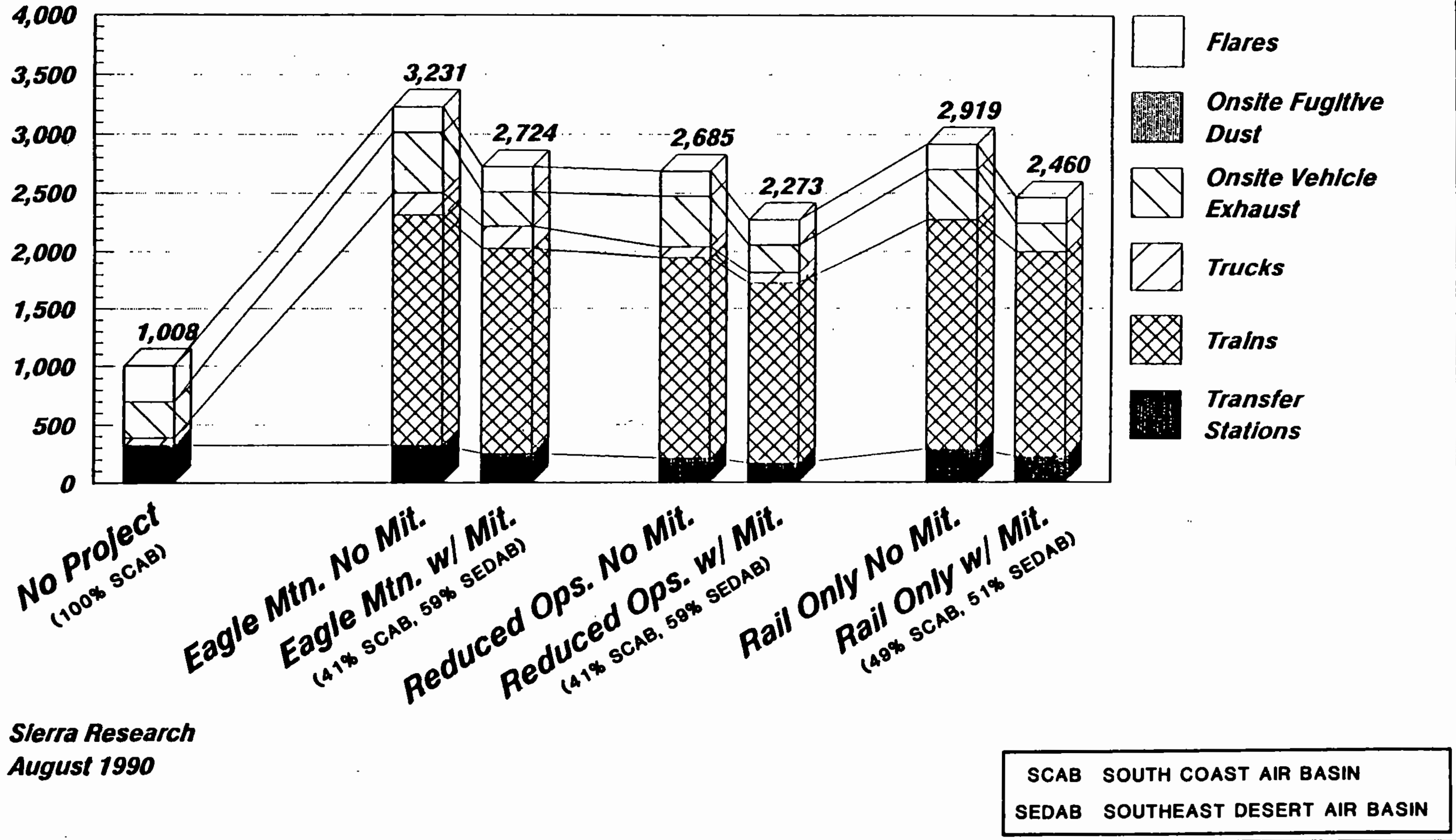


FIGURE 79. COMPARISON OF ALTERNATIVES–OXIDES OF NITROGEN ANNUAL EMISSIONS (TONS/YEAR)

RECON

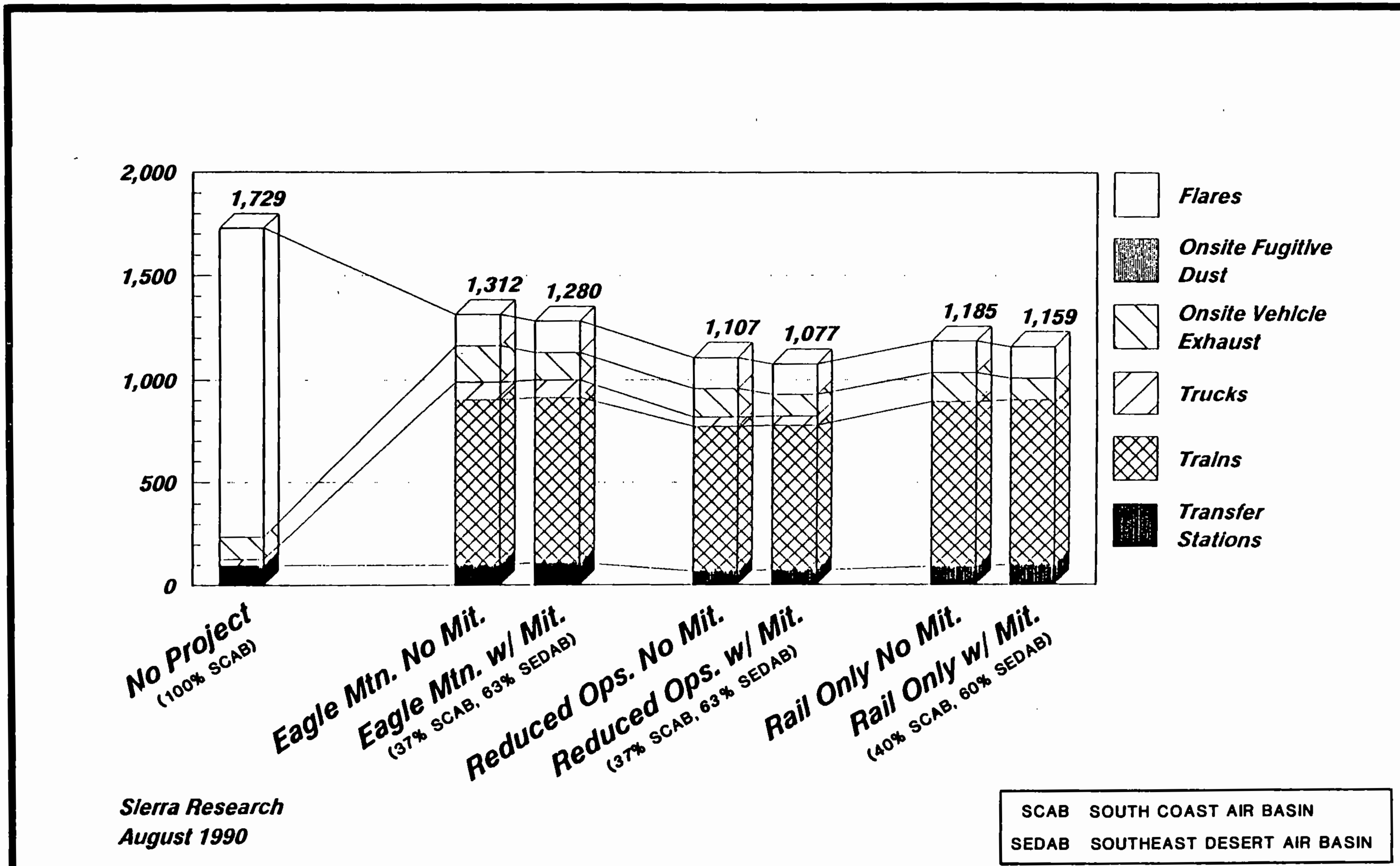


FIGURE 80. COMPARISON OF ALTERNATIVES–CARBON MONOXIDE ANNUAL EMISSIONS (TONS/YEAR)

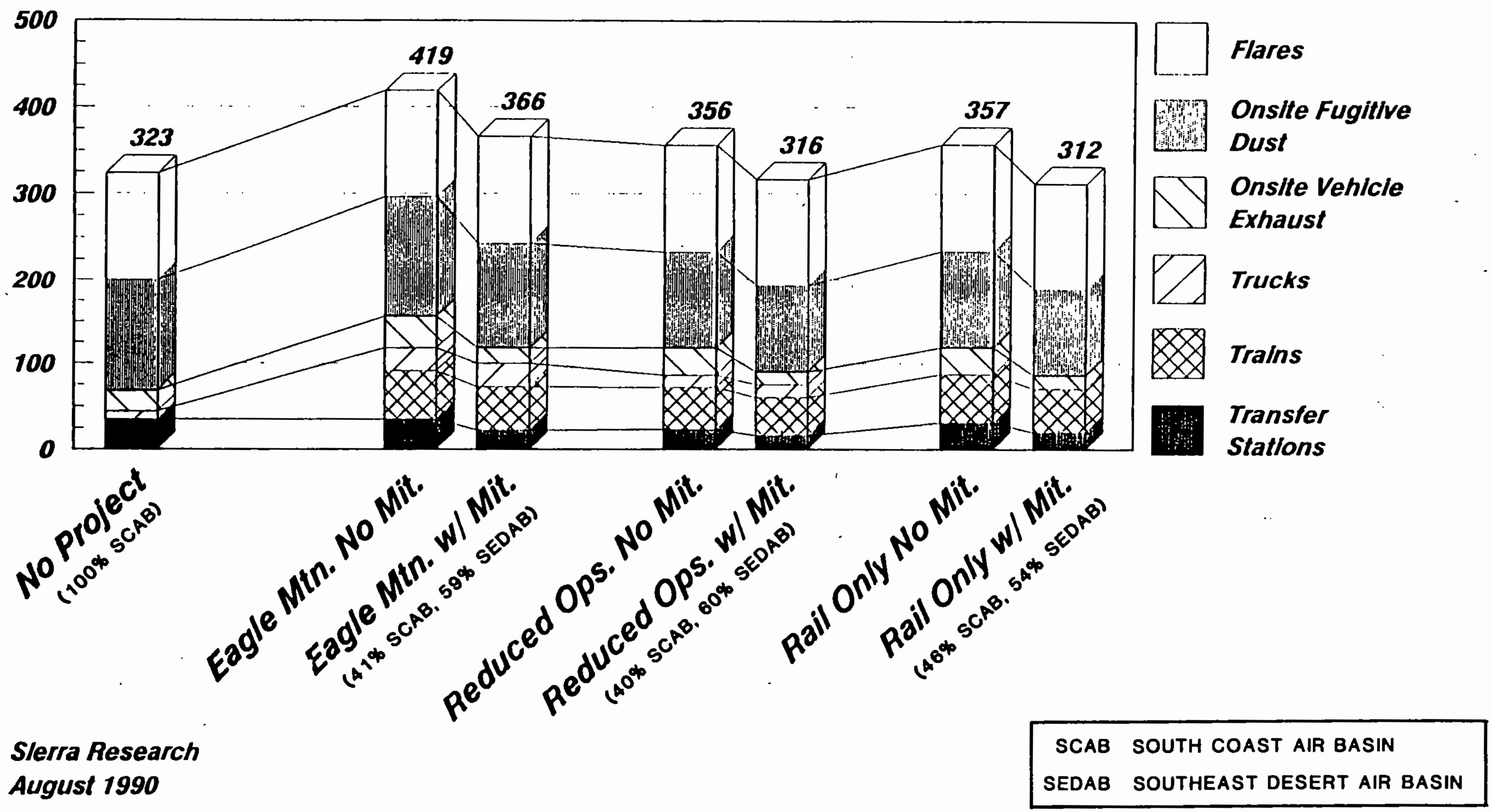
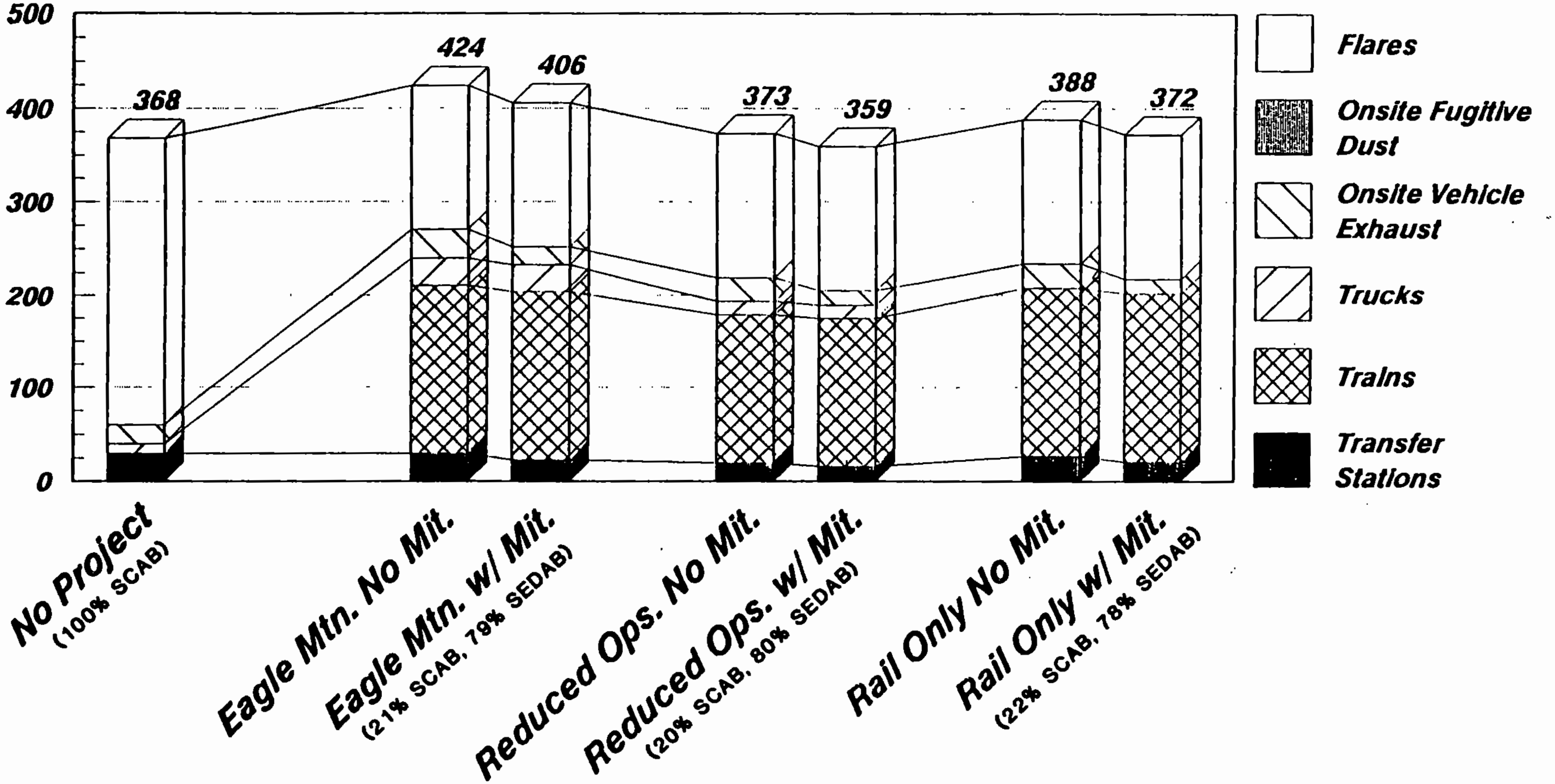


FIGURE 81. COMPARISON OF ALTERNATIVES–PARTICULATES (PM10) ANNUAL EMISSIONS (TONS/YEAR)

RECON



Sierra Research
August 1990

SCAB	SOUTH COAST AIR BASIN
SEDAB	SOUTHEAST DESERT AIR BASIN

FIGURE 82. COMPARISON OF ALTERNATIVES-HYDROCARBONS ANNUAL EMISSIONS (TONS-YEAR)

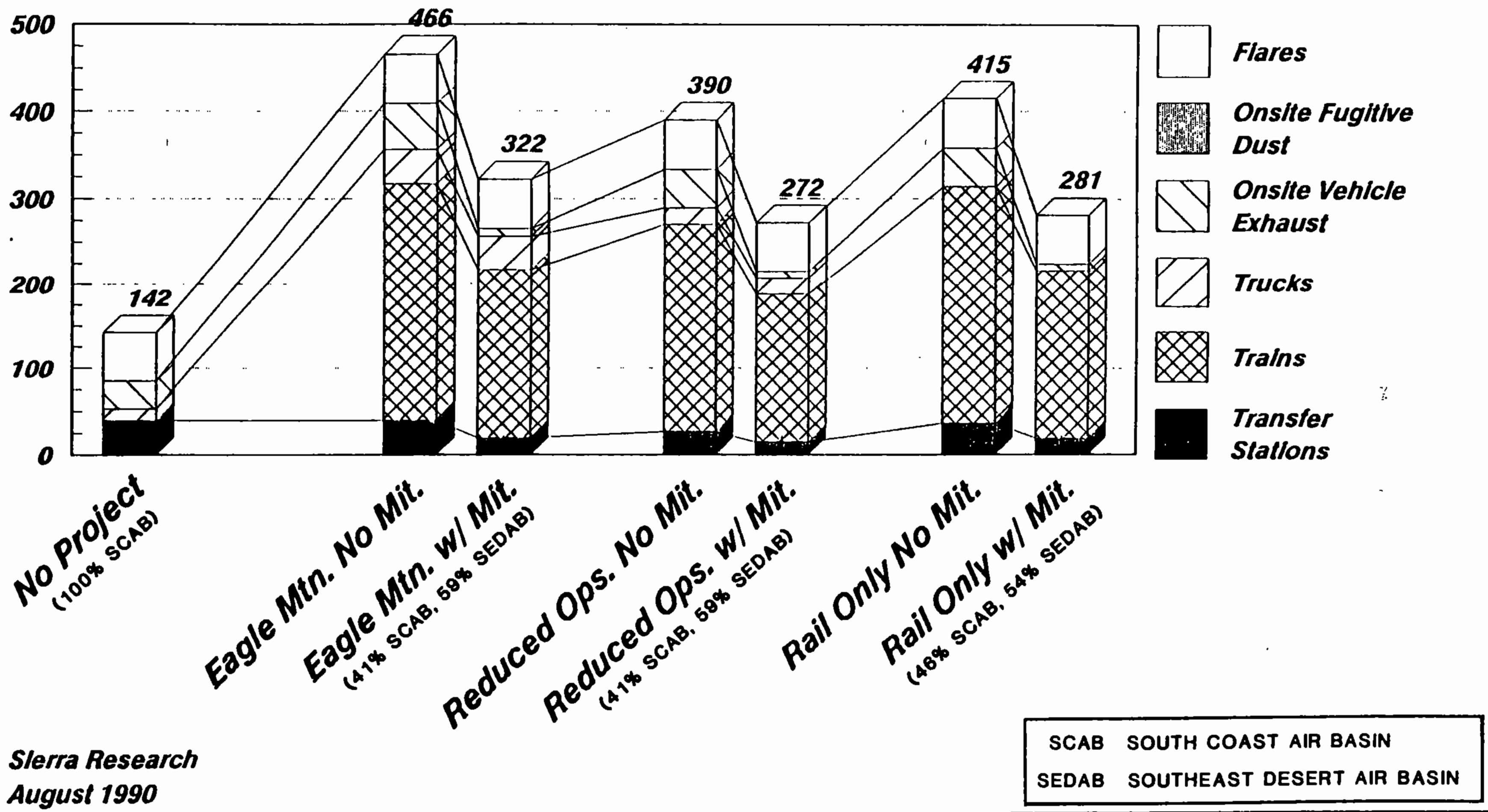


FIGURE 83. COMPARISON OF ALTERNATIVES–SULFUR OXIDES ANNUAL EMISSIONS (TONS/YEAR)

RECON

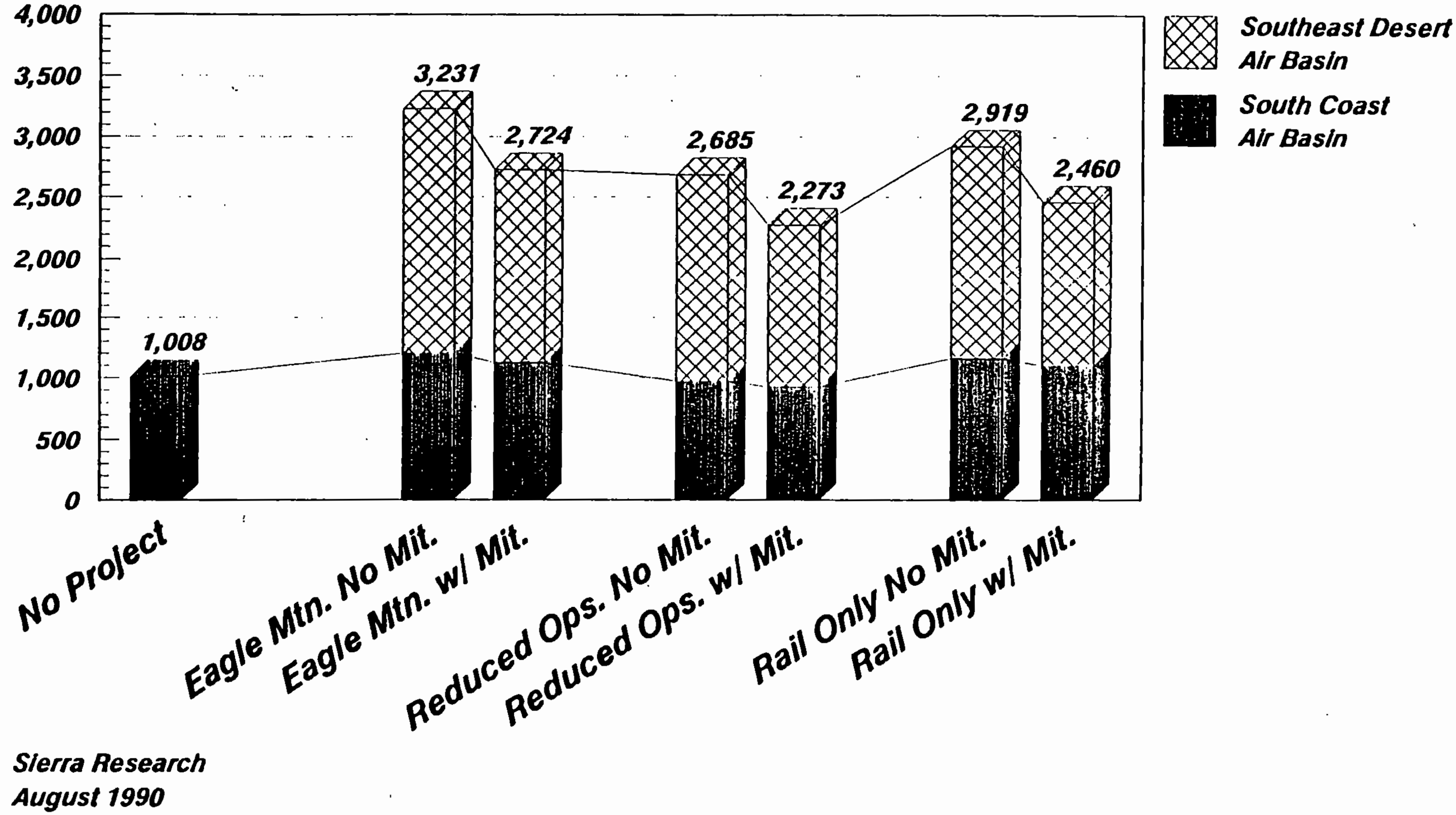


FIGURE 84. BASIN IMPACTS–OXIDES OF NITROGEN ANNUAL EMISSIONS (TONS/YEAR)

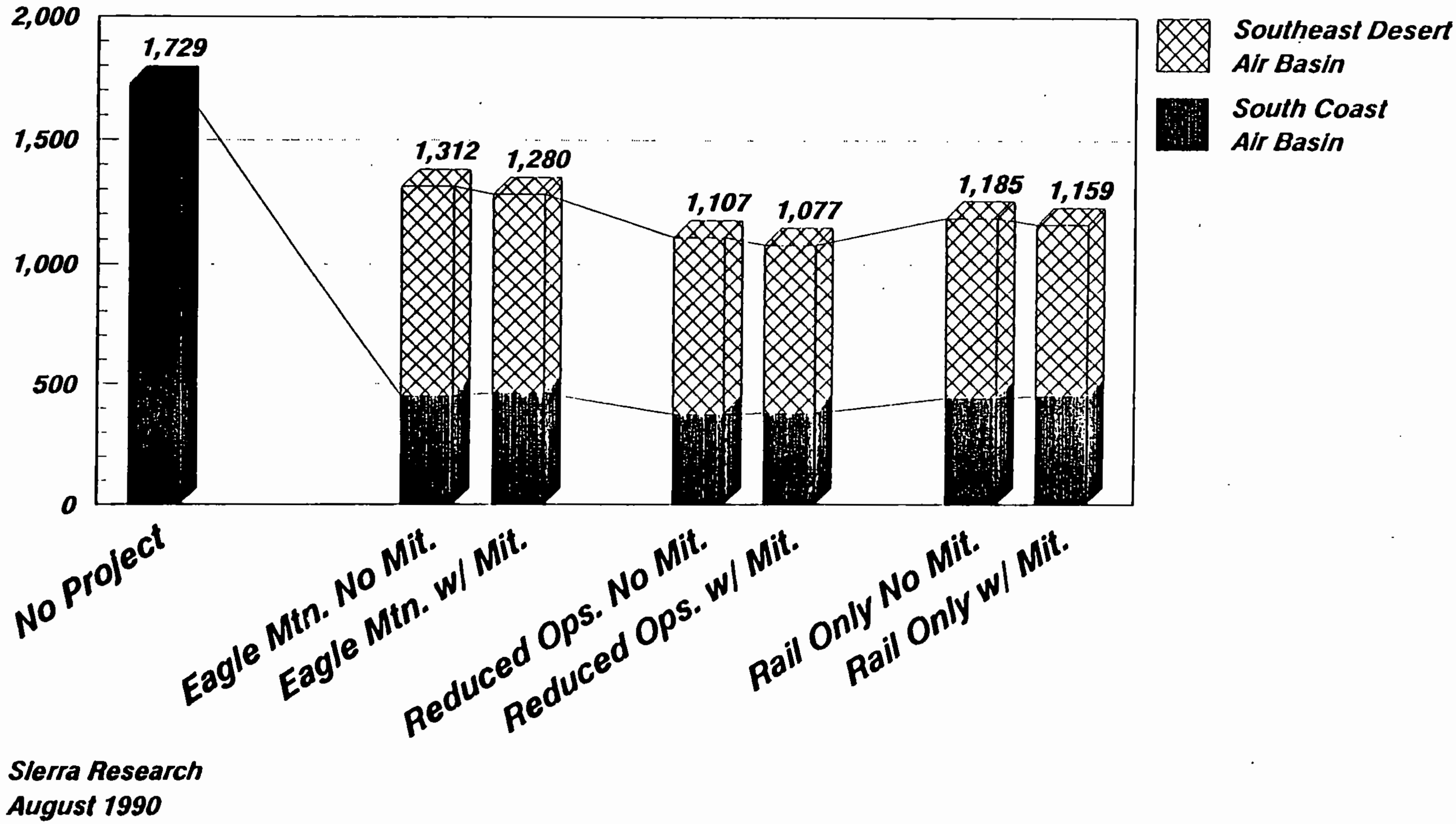


FIGURE 85. BASIN IMPACTS–CARBON MONOXIDE ANNUAL EMISSIONS (TONS/YEAR)

RECON

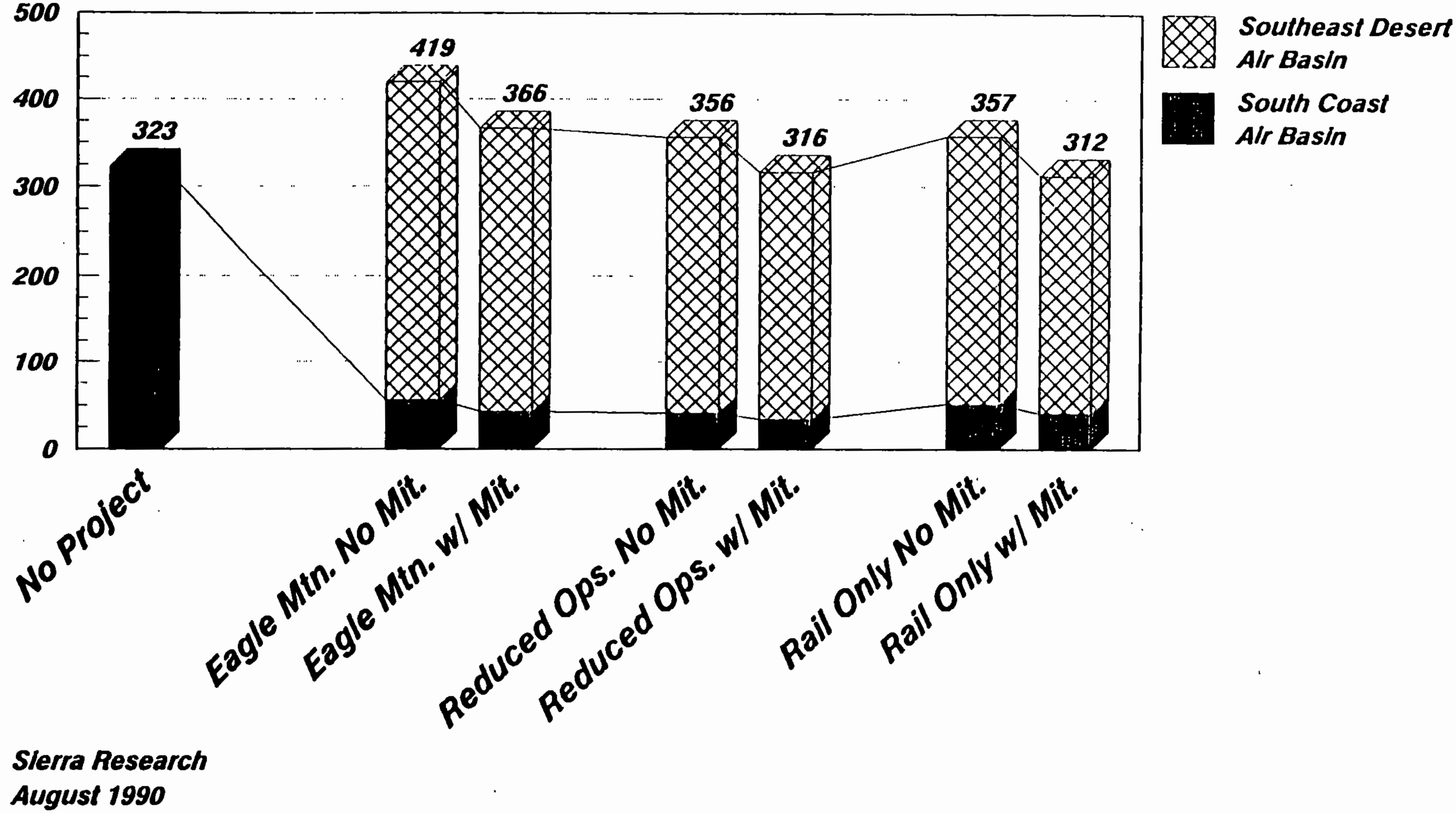


FIGURE 86. BASIN IMPACTS-PARTICULATES (PM10) ANNUAL EMISSIONS (TONS/YEAR)

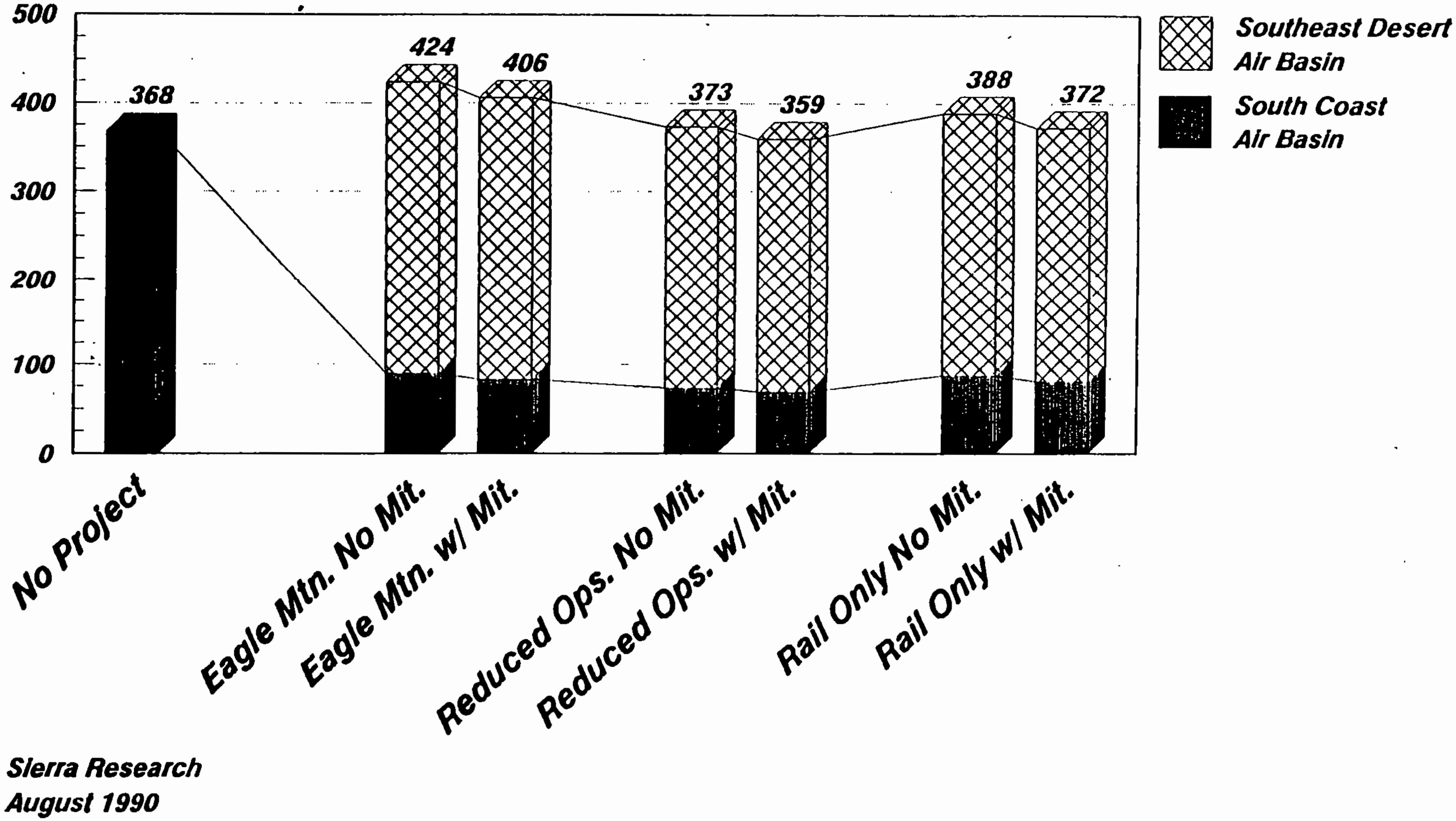


FIGURE 87. BASIN IMPACTS–HYDROCARBONS ANNUAL EMISSIONS (TONS/YEAR)

RECON

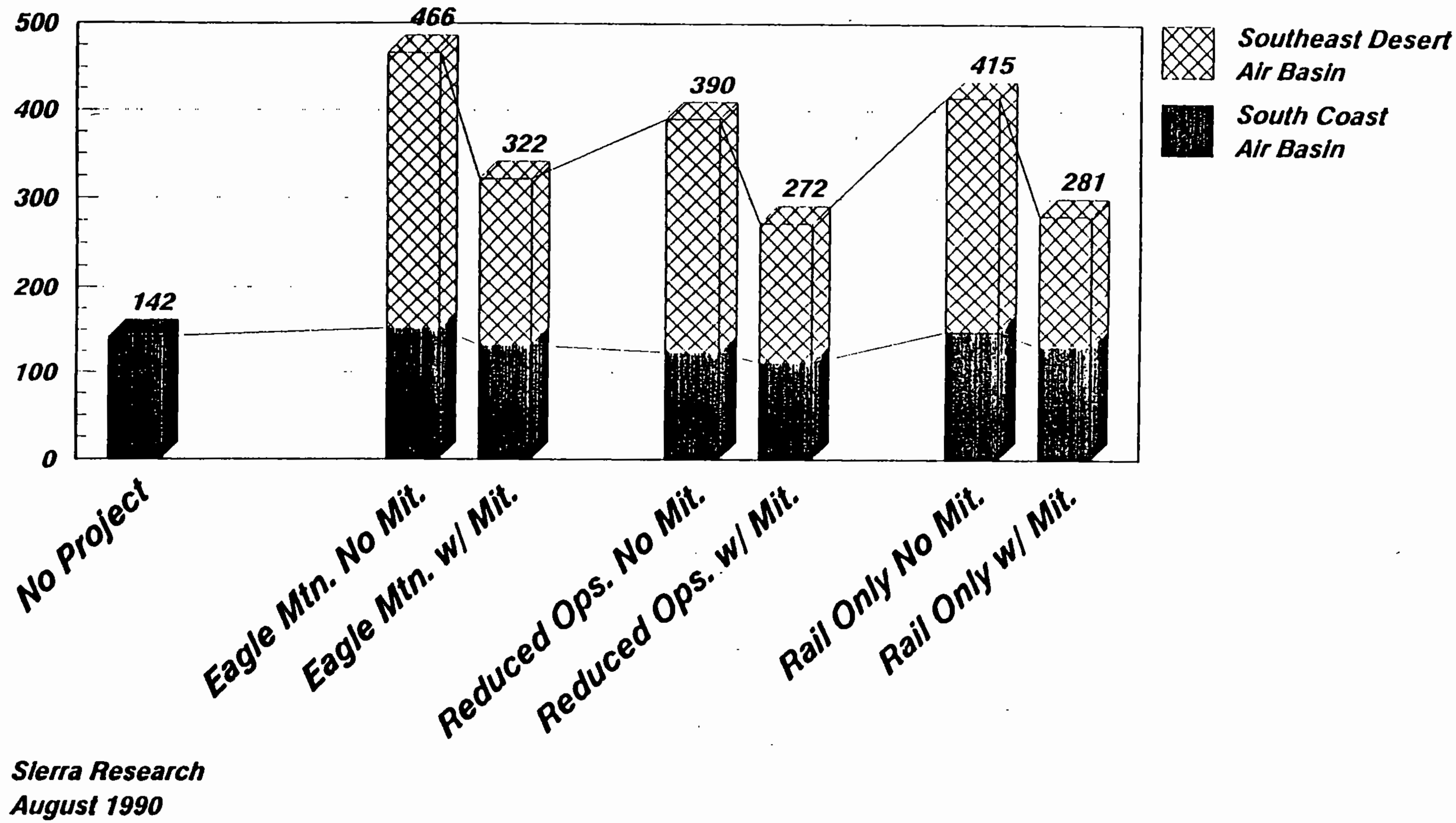


FIGURE 88. BASIN IMPACTS–SULFUR OXIDES ANNUAL EMISSIONS (TONS/YEAR)

With respect to oxides of nitrogen, the data in Figure 79 show that each of the alternatives would result in a substantial increase in oxides of nitrogen emissions compared to the No Project alternative, due principally to the emissions associated with long-distance transportation of 16-20 thousand tons of waste per day. While the mitigation measures would reduce these impacts somewhat, the remaining NOx emissions would still be considered a significant impact. As discussed previously, the NOx emissions from the No Project alternative would be considered a significant impact as well.

For carbon monoxide, each of the project alternatives results in a decrease in emissions relative to the No Project alternative, as shown in Figure 80. This is due to the anticipated lower CO emission rate from new flares (or other combustion devices) equipped with oxidizing catalysts. This reduction would also be seen if gas generation rates in the drier desert climate prove to be lower than those currently experienced in the SCAB.

The PM10 emissions from the alternatives are shown in Figure 81. The data indicate that total PM10 emissions are approximately equal, regardless of the alternative. The reduced operations and rail only alternatives, with mitigation, result in slightly lower PM10 emissions than the No Project alternative.

Non-methane hydrocarbon emissions data are presented in Figure 82. The results here are similar to those described above for particulates. Both of the 16,000 tpd alternatives would result in NMHC emissions comparable to those under the No Project alternative. The 20,000 tpd operations would result in a small increase in emissions of this pollutant.

Sulfur oxides emissions from any of the project alternatives would be much higher than those of the No Project alternative, as shown in Figure 83. This is due to the use of sulfur-containing diesel fuel to transport 16-20 thousand tons of waste per day. The large reductions in SOx emissions associated with mitigation measures are due to the use of ultra-low-sulfur fuel oil in all equipment owned or operated by Mine Reclamation Corporation.

Figures 84-88 present the same data, separated for the two air basins in which air quality impacts would be felt.

Figure 84 shows the NOx emissions from the alternatives. The data indicate that NOx emissions in the SCAB would be comparable under all of the alternatives to the No Project alternative; the principal increase in NOx emissions would occur in the SEDAB. The reduced operations alternative would actually result in lower NOx emissions in the SCAB than the No Project alternative; however, this conclusion must be viewed with caution, since the No Project alternative assumed the disposal of 20,000 tpd of waste, while the reduced project alternative disposes of only 16,000 tpd of waste. On an equivalent waste basis, the proposed action with mitigation results in a 118 tpy increase in NOx emissions in the SCAB.

Figure 85 shows that CO emissions, both in total and in the SCAB, would be substantially reduced under all of the alternatives compared with the No Project alternative. However, CO emissions would increase in the SEDAB.

With respect to particulates, Figure 86 shows that each of the alternatives would result in a substantial reduction in the SCAB compared with the No Project alternative. This is due to the relocation of the numerous particulate-emitting landfill operations to the desert site. Total particulate emissions are increased due to the increased transportation emissions.

Figure 87 shows that NMHC emissions would also be substantially reduced in the SCAB under each of the alternatives as compared with the No Project alternative. This is due largely to the relocation of flare gas emissions to the desert site.

Finally, SOx emissions in the SCAB would be the same or slightly lower under each of the alternatives when compared with the No Project alternative, as shown in Figure 88. This is due to a balance between increased SOx emissions from waste transportation and decreased SOx emissions associated with the relocation of waste handling operations from the SCAB landfills to the desert site.

2. Ambient Concentrations

Assumptions and Assessment Guidelines. In addition to estimating the emissions from the project, an assessment was made of the impact on ambient air quality which would result from these emissions. The maximum ground level concentrations for pollutants were determined for on-site operations. In addition, for the rail haul of waste, an at-grade crossing of street traffic in a residential area was evaluated and maximum ground level concentrations were determined.

To further maximize potential impacts, receptor sites closest to each source, or nearest the maximum ground level impact site, were selected for analysis. For the train haul scenario, the nearest receptor was represented as a hypothetical residence lying immediately outside the narrowest right-of-way width found along the line between Los Angeles and Ferrum Junction. For the on-site sources, the target receptor selected was the one closest to the project's southern boundary.

Worst-case wind conditions were simulated by varying wind speeds across the spectrum found in this region and at a series of directions around the compass. Wind speeds and atmospheric stability modeling combinations, as specified by the Environmental Protection Agency, were used to determine the highest impacts irrespective of direction. Then, these conditions were combined with the wind directions blowing from project sources toward identified residences to estimate the highest concentrations to which members of the public might reasonably be exposed as a result of operation of the project.

Air quality models are computer simulations which translate source-specific emission information into impacts on ambient air quality over local or regional areas. Several different approved models can be used to make this translation. Those which have been considered for the analysis are ISCST, COMPLEX I, PAL, and SHORTZ. For reasons discussed in the air quality technical appendix (Sierra Research 1990:60-61), the analysis of the Eagle Mountain project was performed using the SHORTZ model.

In assessing the significance of the resulting pollutant concentrations from the project, various measures may be used. As with the assessment of emissions, various thresholds and criteria used in the regulation of industrial point sources may be used. Examples of typical criteria are given in Table 32. Besides these regulatory criteria, the state and federal ambient air quality standards, which were presented in the Environmental Setting portion of this report (see Table 11), can also be used as a measure of significance regarding pollutant concentrations.

a. Proposed Action

Impacts

This analysis presents the impacts of the project on ambient concentrations of pollutants. This analysis was performed for the area surrounding the landfill site; for the boundary of the nearest Class I area, the Joshua Tree National Monument; and for a typical rail crossing in the SCAB.

All of the analyses described below were based on several conservative assumptions with the result that the concentrations shown are much higher than the levels which would likely be experienced. First, landfill gas generation rates are the maximum forecast, 66.25 million cubic feet per day. This forecast was based on gas generation rates in the SCAB. As discussed elsewhere in this report, gas generation rates at the Eagle Mountain site are expected to be much lower. Furthermore, the maximum landfill gas generation rates are not expected to be reached for at least 30 years after the project begins operation, if they are reached at all.

Second, the analyses were performed based on the assumption that the landfill face was at an elevation which is not expected to be reached for at least 30 years.

Third, only currently available emission control technologies have been assumed, although recent history has shown that dramatic improvements will likely be made between the start of the project and the date worst-case impacts could occur.

Fourth, all of the air quality models were run in a screening mode. This means that the impacts were analyzed for a standard combination of wind speeds, wind directions, and mixing heights which do not necessarily reflect site conditions and which were selected to maximize the modeled concentrations. Upon the collection of at least one year of actual weather data at the project site, the modeling analyses should be performed again. The use of the screening mode

TABLE 32
SAMPLE THRESHOLDS BASED ON CONCENTRATIONS FOR POINT SOURCE REGULATION

Agency and Regulation	Concentration - MG/Cubic Meter (Average Time) HC	NO_x	CO	SO_2	PM10
EPA significant impact non-attainment area	--	1(ann)	500(8 hr) 2,000(1 hr)	1(ann) 5(24 hr) 25(3 hr)	
EPA significant impact or allowable measurement in Class I area	--	10	1(24 hr)	2(ann) 5(24 hr) 25(3 hr)	5(ann) 10(24 hr)
EPA land below which monitoring is not required	--	14	575(8 hr)	13(24 hr)	10(24 hr)

SOURCE: Sierra Research 1990:Tables 15-18 (see Appendix E).

results in overestimates of concentrations, particularly for longer averaging periods (e.g., 24 hours, annual average).

Project Site Area. These levels are predictions of the worst-case project impacts at any location outside of the project boundary. These concentrations are projected, in the absence of mitigation measures, at a location towards the northwest corner of the community of Eagle Mountain. The analysis is based on the extreme worst-case assumption that the elevation of the landfill has risen to near the rim of the present mine site, while the size of the tailing pile has been substantially reduced. Thus, these conditions would reflect worst-case operations after at least 30 years of project operations. At other locations, the impacts would be substantially less.

Table 33 presents the results of the air quality modeling analysis. The data indicate that the project's impacts before mitigation would represent the following fractions of the most stringent ambient air quality standards for each pollutant:

Carbon Monoxide	1%
Nitrogen Dioxide	71%
Sulfur Dioxide	20%
Fine Particulates (PM10)	153%

The relative contribution of sources to these levels are as follows:

	Landfill Equipment*	Flares
Carbon Monoxide	47%	53%
Nitrogen Dioxide		
1-hr average	75%	25%
Annual average	36%	69%
Sulfur Dioxide		
1-, 3-hr average	19%	81%
Annual average	8%	92%
Fine Particulates	99%	>1%

*Includes fugitive dust.

The data indicate that in the absence of mitigation measures, the project could result in exceedances of the state air quality standards for nitrogen dioxide and state and federal standards for fine particulate matter. Emissions of carbon monoxide and sulfur dioxide are not expected to result in violations of air quality standards for those pollutants, even in combination with emissions from other sources.

TABLE 33
PROPOSED PROJECT MAXIMUM IMPACT ON AMBIENT AIR QUALITY WITHOUT MITIGATION

Pollutant/Averaging Time	California Standards	National Standards	Maximum Off-Site Concentration	Maximum Background (1968-88)	Maximum Cumulative Impact
	Concentrations MG/Cubic Meter				
CO					
1-hour	23,000	40,000	188.3	14,950	15,138
8-hour	10,000	10,000	131.8	6,344	6,476
NO_2					
1-hour	470	-	332.0	207	539
Annual	-	100	27.3	32	59
SO_2					
1-hour	655	-	71.3	210	281
3-hour	-	1,300	64.1	-	-
24-hour	131	365	26.4	58	84
Annual	-	80	6.6	5	12
PM10					
24-hour	50	150	76.5	368	445
Annual	30	50	19.1	65	84

SOURCE: Sierra Research 1990:Table 29 (see Appendix E).

Class I Areas. The federal Prevention of Significant Deterioration (PSD) program requires an extra level of protection for air quality in the vicinity of national parks and other special protected areas. The closest such area to the Eagle Mountain project is the Joshua Tree National Monument, which has its southern boundary approximately two miles north of the project site.

Table 34 presents the results of the modeling analysis at the Joshua Tree boundary and compares these values with the allowable Class I area "increments." (It is expected that the Eagle Mountain project would not be subject to a formal PSD review, since project emissions would be below the regulatory thresholds for review. However, these increments of allowable growth can be used as one basis to evaluate the significance of the project's impacts.)

The analysis indicates that in the absence of mitigation, the project impacts will exceed allowable increments at the Joshua Tree boundary for all three pollutants for which increments have been established: nitrogen dioxide, sulfur dioxide, and fine particulates (PM10). As noted previously, this conclusion is based on extremely conservative modeling assumptions and will probably change upon a reanalysis using actual weather data from the project site.

In addition to this quantitative estimate of the project impact, three other concerns of the National Park Service should be noted. First, because nitrogen oxides are precursors (along with reactive organic gases) for the formation of ozone, the increases of nitrogen oxides in the SEDAB attributable to the project may worsen ozone concentrations within Joshua Tree National Monument. Second, increases in air pollution may adversely affect soil chemistry, in particular by increasing available nitrates in the soil. Finally, the fugitive dust and other particulate emissions from the project would contribute to the increase in desert haze which has been documented by the park service over the years.

Typical Rail Crossings. During the scoping process, several commenters suggested that there may be adverse air quality impacts at locations in southern California where rail crossings are at grade and periodically result in traffic backups waiting for a passing train. Using the same data presented elsewhere in the report regarding traffic impacts, a modeling analysis was performed to evaluate the potential air quality impacts during these events. The results are presented in Table 35.

The results of this analysis are presented for one-hour averaging periods only, since these impacts would occur for only short periods of time during the day. The data indicate that there would be only a minor contribution to carbon monoxide during train crossings. The nitrogen dioxide impact reflects the short-term concentration which could be reached near the intersection, assuming worst-case weather conditions. As with previous analyses, these levels are likely to overestimate actual concentrations. These effects of the project are not considered significant impacts.

TABLE 34
PROPOSED PROJECT MAXIMUM IMPACT ON CLASS I AREA WITHOUT MITIGATION

Pollutant/Averaging Time	Concentrations in MG/Cubic Meter	
	Allowable Class I Increment	Maximum Impact at Class I Area
NO_2		
Annual	2.5	8.1
SO_2		
3-hour	25.0	18.9
24-hour	5.0	8.0
Annual	2.0	2.0
PM10		
24-hour	10.0	17.9
Annual	5.0	4.5

SOURCE: Sierra Research 1990:Table 29 (see Appendix E).

TABLE 35
PROPOSED PROJECT
AIR QUALITY IMPACTS AT TYPICAL RAIL CROSSINGS

	Concentrations in MG/Cubic Meter		
Pollutant	California Standards	National Standards	Maximum Impact
CO 1-hour	23,000	40,000	332
NO_2 1-hour	470	-	143

SOURCE: Sierra Research 1990:Table 30 (see Appendix E).

Mitigation

All of the mitigation measures discussed above which would reduce the total emissions of the project would also tend to reduce its contribution towards ambient pollutant concentrations. Table 36 illustrates the effect on pollutant concentrations from implementing the various emissions mitigation measures described earlier. The results which reflect the mitigation measures indicate that the state standard for nitrogen dioxide, and state and federal standards for fine particulates may still be exceeded. In addition, the analysis projects that Class I increments would still be exceeded for nitrogen dioxide, sulfur dioxide, and fine particulate matter.

To further narrow the area of concern, an additional analysis was performed without the flares. The data indicate that all of the air quality standards (with the exception of PM10 standards) and Class I increments would be achieved if the flares could be replaced with an alternative method of disposal. Upon a reanalysis using actual weather data from the project site, further mitigation measures may be required. As discussed previously, each of these air quality impact analyses reflect a high degree of conservatism, including:

- Maximum potential landfill gas generation rates which may never be reached in the project's dry, desert location;
- Landfill operations, locations, and gas generation rates based on projections 30 years (or more) in the future, but reflecting only currently available air pollution control technologies;
- Use of a screening mode for all air dispersion models, which results in worst-case assumptions for weather and overestimates of pollutant concentrations, particularly for longer averaging periods.

Upon the collection of at least one year of actual weather data, the air quality modeling analysis should be performed again. Therefore, additional conditions should be placed on the project approval:

1) Prior to the receipt of waste material for disposal at the landfill site, MRC shall complete the acquisition of at least 12 months of valid meteorological data at the site. The data shall be collected in accordance with a monitoring plan reviewed and approved by the South Coast Air Quality Management District and the U.S. Environmental Protection Agency.

2) Prior to the receipt of waste material for disposal at the landfill site, MRC shall complete a revised air quality modeling analysis and screening level health risk assessment analysis using site specific meteorological data. This analysis shall be submitted to the County of Riverside Department of Health as part of the Report of Disposal Site Information required to obtain a solid waste facilities permit. If this analysis indicates that there is a potential for significant adverse impacts due to operation of the facility, MRC shall develop and

TABLE 36
PROPOSED PROJECT
EFFECT OF MITIGATION AND ELIMINATING GAS FLARE

Pollutant/Averaging Time	Concentrations MG/Cubic Meter					
	Maximum Cumulative Impact (Project + Background)			Maximum Impact at Class I Area		
	No Mitigation	with Mitigation	No Flare	No Mitigation	with Mitigation	No Flare
CO						
1-hour	15,138	15,137	15,037	-	-	-
8-hour	6,476	6,475	6,405	-	-	-
NO_2						
1-hour	539	491	405	-	-	-
Annual	59	58	40	8.1	7.7	2.0
SO_2						
1-hour	281	274	216	-	-	-
3-hour	-	-	-	18.9	17.6	1.4
24-hour	84	83	59	8.0	7.8	0.3
Annual	12	11	5	2.0	1.9	0.1
PM10						
24-hour	445	441	441	17.9	17.7	3.6
Annual	84	83	83	4.5	4.4	0.9

SOURCE: Sierra Research 1990:Tables 29, 36, and 37 (see Appendix E).

submit for approval additional mitigation strategies which will reduce remaining significant impacts, if any, to levels which are considered acceptable.

Significance After Mitigation

In the absence of additional mitigation measures, more refined analysis based on more accurate meteorological information and project assumptions, and/or better technologies for disposal of landfill gas without the use of flares, the project impacts on ambient air quality would remain significant.

b. Reduced Landfill Operations Alternative

Impacts

Using the same methodology as for the proposed action, an analysis was performed of the impacts of the reduced operations alternative on ambient concentrations of pollutants. This analysis was performed for the area surrounding the landfill site; for the boundary of the nearest Class I area, the Joshua Tree National Monument; and for a typical rail crossing in the SCAB.

Near the Landfill Site. These levels are predictions of the worst-case project impacts at any location outside of the project boundary. These concentrations are projected, in the absence of mitigation measures, at a location towards the northwest corner of the community of Eagle Mountain. The analysis of impacts under this reduced landfill operations alternative is based on the same extreme worst-case assumptions discussed above for the proposed project.

Table 37 presents the results of the air quality modeling analysis. The data indicate that the impacts before mitigation resulting from the reduced landfill operations alternative would represent the following fractions of the most stringent ambient air quality standards for each pollutant:

Carbon Monoxide	1%
Nitrogen Dioxide	65%
Sulfur Dioxide	20%
Fine Particulates (PM10)	126%

As with the proposed project, the reduced operations alternative would also result in exceedances of the state air quality standards for nitrogen dioxide and state and federal standards for fine particulate matter. Emissions of carbon monoxide and sulfur dioxide are not expected to results in violations of air quality standards for those pollutants, even in combination with emissions from other sources.

TABLE 37
REDUCED LANDFILL OPERATIONS ALTERNATIVE
MAXIMUM IMPACT ON AMBIENT AIR QUALITY WITHOUT MITIGATION

Pollutant/Averaging Time	Concentrations MG/Cubic Meter				
	California Standards	National Standards	Maximum Off-Site Concentration	Maximum Background (1968-88)	Maximum Cumulative Impact
CO					
1-hour	23,000	40,000	184.3	14,950	19,134
8-hour	10,000	10,000	129.8	6,344	6,473
NO_2					
1-hour	470	-	306.4	207	513
Annual	-	100	26.8	32	59
SO_2					
1-hour	655	-	69.8	210	281
3-hour	-	1,300	62.8	-	-
24-hour	131	365	26.2	58	84
Annual	-	80	6.5	5	12
PM10					
24-hour	50	150	63.2	368	431
Annual	30	50	15.8	65	81

SOURCE: Sierra Research 1990:Table 49 (see Appendix E).

Class I Area. Table 38 presents the results of the modeling analysis for the reduced operations alternative at the Joshua Tree boundary and compares these values with the allowable Class I area "increments." (It is expected that the Eagle Mountain project would not be subject to a formal PSD review, since project emissions would be below the regulatory thresholds for review. However, these increments of allowable growth can be used as one basis to evaluate the significance of the project's impacts.)

The analysis indicates that in the absence of mitigation, the impacts for this alternative will exceed allowable increments at the Joshua Tree boundary for all three pollutants for which increments have been established: nitrogen dioxide, sulfur dioxide, and fine particulates (PM10). As in the case of the proposed action, this conclusion will probably change upon a reanalysis using actual weather data from the project site.

Typical Rail Crossings. Impacts at typical rail crossings under the reduced operations alternative would be identical to those discussed above for the proposed action. However, the number of trains per day would be approximately 12 percent fewer, thus reducing the frequency with which these impacts would occur.

Mitigation

All of the mitigation measures discussed above which would reduce the total emissions of the project would also tend to reduce its contribution towards ambient pollutant concentrations. Table 39 illustrates the effect on pollutant concentrations from implementing the various emissions mitigation measures described earlier. The results which reflect the mitigation measures indicate that the state standard for nitrogen dioxide, and state and federal standards for fine particulates may still be exceeded. In addition, the analysis projects that Class I increments would still be exceeded for nitrogen dioxide, sulfur dioxide, and fine particulate matter for some averaging times.

The additional conditions described above for the proposed project relating to the gathering of a full year of meteorological data, performance of new air quality modeling, and development of additional mitigation measures also apply to the reduced operations alternative.

Significance After Mitigation

In the absence of additional mitigation measures, more refined analysis based on more accurate meteorological information and project assumptions, and/or better technologies for disposal of landfill gas without the use of flares, the impacts of the reduced operations alternative on ambient air quality would remain significant.

TABLE 38
REDUCED OPERATIONS ALTERNATIVE
MAXIMUM IMPACT ON CLASS I AREA WITHOUT MITIGATION

Pollutant/Averaging Time	Concentrations in MG/Cubic Meter	
	Allowable Class I Increment	Maximum Impact at Class I Area
NO_2		
Annual	2.5	8.0
SO_2		
3-hour	25.0	18.6
24-hour	5.0	8.0
Annual	2.0	2.0
PM10		
24-hour	10.0	17.7
Annual	5.0	4.4

SOURCE: Sierra Research 1990:Table 49 (see Appendix E).

TABLE 39
REDUCED OPERATIONS ALTERNATIVE
EFFECT OF MITIGATION

Pollutant/Averaging Time	Concentrations MG/Cubic Meter: Maximum Cumulative Impact (Project + Background)		Maximum Impact at Class I Area	
	No Mitigation	with Mitigation	No Mitigation	with Mitigation
CO				
1-hour	15,134	15,133	-	-
8-hour	6,473	6,472	-	-
NO_2				
1-hour	513	484	-	-
Annual	59	57	8.0	7.6
SO_2				
1-hour	281	274	-	-
3-hour	-	-	18.6	17.6
24-hour	84	83	8.0	7.8
Annual	12	11	2.0	1.9
PM10				
24-hour	431	428	17.7	17.6
Annual	81	80	4.4	4.4

SOURCE: Sierra Research 1990:Tables 29, 36, and 37 (see Appendix E).

a. Proposed Action with Rail Access Only Alternative

Impacts

Ambient concentrations associated with the rail access only alternative would be the same as those discussed above for the reduced operations alternative.

Mitigation

The same mitigation measures discussed above for the proposed project would be applicable to the rail access only alternative, with the exception of those measures directed towards on-highway trucks.

Significance After Mitigation

As with the proposed project and the reduced operations alternative, the rail access only alternative would also have significant and unmitigated impacts on ambient air quality.

d. No Action Alternative

Impacts

Due to the large number of existing landfill sites, it is not reasonably possible to estimate the ambient pollutant concentrations at these sites. Ambient concentrations may be either higher or lower depending on local geography and weather patterns. For the local area around Eagle Mountain, the No Project alternative would avoid localized impacts to ambient air quality.

Mitigation

None is available with this alternative.

Significance After Mitigation

Because the SCAB is currently a nonattainment air basin and because substantial air pollutant emissions are associated with the disposal of solid waste by any means, the No Project alternative would contribute to violations of state and national ambient air quality standards in that air basin. Thus, its contribution to ambient air quality in the SCAB would be considered a significant impact. The No Project alternative would, however, avoid contributing to a similar impact in the SEDAB and the area around Eagle Mountain.

3. Screening Level Health Risk Assessment

Assumptions and Assessment Guidelines. The screening health risk assessment was performed using the results from the emissions inventory and ambient air quality analyses reviewed above. Thus, the assumptions incorporated into that work carry over into this topic. Of particular importance are the conservative or worst-case assumptions relating to the air dispersion analysis. These include a variety of assumptions intended to identify the maximum ground level concentrations from the project (wind speed, direction, and local atmospheric stability assumptions to maximize impacts) and the assumptions relating to the rate of landfill gas production. The resulting ground level concentrations of various toxic compounds contained within landfill gas were then combined with unit risk factors for each to estimate the cancer risk from each component. Then the individual cancer risks were summed to estimate the overall cancer risk from the landfill gas emissions. The analysis is presented in Appendix E (Sierra Research 1990:95, Tables 31 and 32).

In California, AB 2588 established a process for developing an inventory of toxic substances, determining their health risks, and notifying the public regarding those risks. Proposition 65 requires warnings to the public if they are exposed to significant concentrations of substances listed by the Governor as causing cancer or reproductive toxicity. Regulations implementing these measures require health risk assessments for toxic substances and identify risk levels which are considered not significant. For example, for substances that cause cancer, the "no significant risk" level is established as one excess case of cancer in an exposed population of 100,000, assuming a lifetime exposure (Sierra Research 1990:46). This equates to ten in one million.

The typical regulatory process using risk assessments involves several steps, the first of which is the preparation of a screening level assessment. The screening level assessment is known to conservatively overestimate the frequency of cancer. If the results of the screening level assessment exceed ten in one million, then a more detailed analysis using a more accurate air dispersion model and/or more accurate multipath risk assessment procedure is used. Thus, the screening level assessment results presented here are by no means a final determination of the actual risk represented by the project.

a. Proposed Action

Impacts

As discussed in the Public Health and Safety section of this EIS/EIR, landfill gases can contain trace quantities of materials which are considered to be toxic air contaminants. For this analysis, an estimated 20 percent of these gases are assumed to escape from the landfill directly into the air, while the remaining 80 percent are expected to be captured by the landfill gas collection system and burned in the flares. A screening level health risk assessment was performed on the flare and fugitive gas emissions using techniques recommended by the California Air Pollution Control Officer's Association. The results are presented in Appendix E (Sierra Research 1990:95).

The screening analysis indicates that the increased cancer risk from the proposed facility, based on the maximum gas production rate and the highest concentrations of trace toxic air contaminants, would be 19 in a million. Based on the maximum gas production rate and average concentrations of trace toxic air contaminants, the increased cancer risk from the landfill operation would be approximately six in a million. This maximum risk would occur in the community of Eagle Mountain. As discussed above, these results are likely overestimates of the actual risk.

An analysis of the source of this risk indicates that 98 percent of the risk is associated with fugitive landfill gas emissions, and not the flares. Consequently, the fact that the project site is located in a dry climate where gas generation rates are expected to be lower is beneficial. In addition, the risks are associated with gas generation rates which would not be reached for 30 years, if ever. Nonetheless, this area will be addressed in a more refined modeling analysis, and additional mitigation measures may be required.

Mitigation

The project design includes measures to intercept and remove any significant volumes of hazardous wastes within the municipal waste stream. These measures would serve to minimize the potential for certain of the toxic substances in typical landfill gas that pose a health risk. The requirement discussed above under Ambient Air Quality regarding meteorological data collection and updating the analysis of air quality effects as part of the Report of Disposal Site Information will also serve to resolve uncertainties associated with the conservative nature of the analysis and to identify additional mitigation measures if necessary.

Significance After Mitigation

Based on the results of the screening level health risk assessment, the risk from toxic air contaminants associated with the Eagle Mountain project may be greater than 10 in a million, which is typically assumed to represent a significant impact.

b. Reduced Landfill Operations Alternative

Impacts

Since landfill gas generation rates would be the same under the reduced operations alternative as under the proposed action, the results of the screening level health risk assessment described above would be applicable to the reduced operations alternative as well.

Mitigation

Mitigation measures under the reduced operations alternative would be the same as those for the proposed action. These include the measures designed into the project to minimize the presence of toxic substances and the requirement for a more refined analysis and the identification of additional mitigation, if necessary, as part of the Report of Disposal Site Information.

Significance After Mitigation

Potential impacts to public health under the reduced operations alternative would be identical with those of the proposed project and would be considered significant.

c. Proposed Action with Rail Access Only Alternative

Impacts

Since landfill gas generation rates would be the same under the rail access only as under the proposed action, the results of the screening level health risk assessment described above would be applicable to the rail access only alternative as well.

Mitigation

Mitigation measures under the rail access only would be the same as those for the proposed action. These include the measures designed into the project to minimize the presence of toxic substances and the requirement for a more refined analysis and the identification of additional mitigation, if necessary, as part of the Report of Disposal Site Information.

Significance After Mitigation

Potential impacts to public health under the rail access only alternative would be identical with those of the proposed project and would be considered significant.

d. No Action Alternative

Impacts

Due to the large number of existing landfill sites, it is not reasonably possible to estimate landfill gas generation, toxic gas emissions, and resulting health risk for each. Concentrations of toxic gas emissions, and the resulting health risk at each site, may be either higher or lower than the proposed project depending on local geography and weather patterns. Two general statements may be made, however. First, the No Project alternative would avoid any health risk effects for the area around the project site. Second, existing conventional landfills in the southern

California region expose a greater population to the statistical health risks associated with landfill gas emissions and, thus, result in a higher cumulative health risk than the proposed project would.

Mitigation

No mitigation of health risks is available under the No Project alternative, beyond the implementation of regulatory programs that apply to all landfills and sources of toxic air emissions.

Significance After Mitigation

Potential impacts to public health under the No Project alternative would be approximately the same as the proposed project. Due to the greater populations exposed to conventional landfills, the total risk under this alternative would probably exceed that of the proposed project.

4. Consistency with Regulatory Programs

Assumptions and Assessment Guidelines. This discussion is less related to identifying specific impacts and mitigation, but provides an overall summary of applicable regulations which will apply to the project and which will serve as the mechanism to enforce certain of the mitigation measures and requirements for further study identified in the earlier discussions. The applicable regulations and a brief summary of each are discussed in the air quality technical report (Appendix E).

a. Proposed Action

Impacts

Consistency with Federal PSD Levels. The determination as to whether the proposed project will be subject to PSD review is based on its emissions. For the proposed project, the "source" which could be subject to review includes the landfill thermal combustors and the mineral processing equipment.

The use of thermal combustors to incinerate landfill gas, in compliance with all other regulations, could cause the project to exceed prevention of significant deterioration trigger levels at the maximum expected flow rate, in the absence of any mitigation. To reduce project emissions, however, mitigation has been proposed for flare emissions. Such mitigation will be provided through the installation and operation of a selective non-catalytic reduction system and an oxidation catalyst in the event that gas flow rates approach the maximum predicted levels.

The oxidation catalyst, in a temperature regime up to 1400 degrees Fahrenheit, can achieve better than 90 percent control efficiency for carbon monoxide in normal operation. The same catalyst bed will produce reductions in reactive organic gas emissions exceeding 50 percent. The selective non-catalytic reduction catalyst would use ammonia or urea to reduce NOx emissions by 30 percent. The oxidation catalyst system would be installed on the flares if gas generation exceeds approximately 10 million cubic feet per day. The selective catalytic reduction system would be installed if gas generation exceeds approximately 50 million cubic feet per day.

Consistency with Local Requirements. The South Coast Air Quality Management District limits the emissions of various pollutants from many sources in the district, including landfill flares and other gas combustion devices. These rules will apply to the proposed project, and the project has been designed to comply with them. The applicable rules are described in Appendix E (Sierra Research 1990:101-105). The proposed action is expected to comply with each of these regulations.

The SCAQMD New Source Review rules (contained in Regulation II and Regulation XIII of the SCAQMD Rules and Regulations) govern the preconstruction review of new and modified stationary sources that emit nonattainment pollutants. The project site is located in the SEDAB, which is designated as unclassified for all pollutants with respect to the NAAQS. With respect to California ambient air quality standards, the desert portion of Riverside County (including the project site) is designated nonattainment for ozone and fine particulate matter (PM10) and attainment or unclassified for all other pollutants.

As a result of the state nonattainment status for ozone and PM10, the project must undergo New Source Review for these pollutants and their precursors. Therefore, direct and precursor emissions of PM10, as well as ozone precursors, are subject to New Source Review. SCAQMD Rule 1302 defines reactive organic gases and nitrogen oxides as precursors to ozone and reactive organic gases, nitrogen oxides, and sulfur oxides as precursors to particulate matter. New Source Review would not apply to emissions of carbon monoxide, for which state and federal air quality standards are being met.

In the evaluation of projects by the SCAQMD, related fugitive emissions are often included in the calculation of accountable project emissions. With respect to the proposed project, the district will not be permitting the landfill itself. Only the landfill gas collection and disposal (flare) system and the mineral (cover) processing plant will be permitted. District policy has held that the fugitive emissions from the landfill operation per se will not be included in the New Source Review analysis.

Furthermore, SCAQMD policy has been that only those mobile source emissions directly associated with a permit unit must be considered. Since the only permit units at the site will be the flares and the cover processing plant, the district staff has informally concluded that emissions from on-site vehicles, as well as exhaust emissions from project-related cargo carriers (on-highway trucks and locomotives), will not be included in the New Source Review analysis.

Rule 1303 requires that the applicant apply BACT to any new or modified stationary source. In its Best Available Control Technology Guideline, the SCAQMD specifies the minimum control technology requirements for landfill gas flares. The guideline specifies two general alternative levels of control that would apply to the project emissions: (1) the use of control methods that are technologically feasible, barring a demonstration that the methods are not cost- effective or (2) the use of control methods that have been achieved in practice or are contained in an EPA-approved State Implementation Plan, regardless of cost. The likely BACT requirements for the proposed facility are discussed in more detail in the air quality technical appendix.

District Rule 1303 requires that the applicant offset all net emission increases from any new or modified facility. However, Rule 1309 provides that the offset requirement for emissions from landfill gas control equipment can be satisfied through withdrawals from a "Community Bank" of offsets. Since this rule was adopted in June 1990, it is not yet clear how this bank will operate.

Mitigation

No additional mitigation measures beyond those listed earlier are necessary to ensure consistency of the project with applicable regulatory programs. The application, permit review, imposition of control conditions, approval, and inspection process of the SCAQMD will serve to enforce the consistency.

Significance After Mitigation

No significant impacts relative to regulatory compliance would be associated with the project.

b. Reduced Landfill Operations Alternative

Impacts

Consistency with Federal Requirements. The determination as to whether the reduced operations alternative will be subject to PSD review is based on its emissions. As in the case of the proposed action, the "source" which could be subject to review includes the landfill gas flares and the mineral processing equipment. Except for a minor reduction in the emissions associated with on-site mineral processing equipment, the estimate of emissions for the proposed action would be applicable to the reduced operations alternative as well. The additional mitigation proposed for the flares under the proposed action would be applicable to the reduced operations alternative as well and would result in that alternative's emissions being reduced to levels which would not require PSD review.

As in the case of the proposed action, the cover processing operations under the reduced operations alternative would be subject to, and is expected to comply with, the applicable federal New Source Performance Standards for Non-Metallic Mineral Processing Plants (40 CFR 60.670).

Consistency with Local Requirements. The SCAQMD limits the emissions of various pollutants from many sources in the district, including landfill flares and other gas combustion devices. These rules will apply to the reduced operations alternative, and this alternative would comply with them. The applicable rules are discussed in the air quality technical appendix.

SCAQMD New Source Review rules (contained in Regulation II and Regulation XIII of the SCAQMD Rules and Regulations) govern the preconstruction review of new and modified stationary sources that emit nonattainment pollutants. The discussion of this rule with respect to the proposed action would apply to the reduced operations alternative as well.

Mitigation

As with the proposed project, no additional mitigation measures would be necessary under the reduced operations alternative to insure compliance with applicable regulations.

Significance After Mitigation

No significant impacts relative to regulatory compliance would be associated with the reduced operations alternative.

c. Proposed Action With Rail Access Only Alternative

Impacts

The rail access only alternative would demonstrate consistency with applicable federal and local air quality requirements in the same manner as the proposed project and the reduced operations alternative.

Mitigation

As with the proposed project, no additional mitigation measures would be necessary under the rail access only alternative to insure compliance with applicable regulations.

Significance After Mitigation

No significant impacts relative to regulatory compliance would be associated with the rail access only alternative.

d. No Action Alternative

Impacts

It is assumed that existing landfill operations are in compliance with all applicable air quality rules and regulations. It is not clear whether the expansions required to continue accommodating the 20,000 tpd of waste which would otherwise go to the Eagle Mountain landfill would require additional air quality permits.

Mitigation

None is available with this alternative.

Significance After Mitigation

The significance of the potential impact relating to regulatory compliance by existing landfills that would be used under this No Project alternative cannot be assessed.

E. Land Use

1. Compatibility with Existing Land Uses

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if the proposed action presents a conflict with existing land uses in the Eagle Mountain community area.

a. Proposed Action

Impact

The proposed landfill and support facilities would not have a significant impact on the existing land uses within the project area. The East Pit and disturbed areas to the west would be progressively landfilled. The landfill would extend marginally beyond the present boundaries of the disturbed land associated with the mine, and a new railroad container handling yard would displace an existing area of open desert southeast of the East Pit. Existing open space uses are anticipated to be maintained along the margins of the site, and these areas may experience some adverse impacts of noise, light and glare, litter, and dust due to adjacent landfill activities.

Iron ore reserves within the East Pit have been largely depleted. Future mining for iron ore thought to exist east of the East Pit could be mined in conjunction with the landfill proposal, as part of its phased expansion which would assure that the most potentially minable iron resources are impacted last. During Sequence I (0 to 10 years), landfill operations would impact the East Pit - Midsection ore reserve area. Sequence II (11 to 75 years) landfill operations would affect the East Pit - West Extension ore reserve area. During Sequence III of landfill operations (years 76 to 85), the Central Pit reserve area would be impacted. The Final Sequence of landfill operations (years 86 to 115) would impact the extreme eastern portion of the East Pit deposits. Further discussion of mining and mineral resources impacts can be found below in the Geology section of this draft EIS/EIR.

Any future mining activities would benefit landfill development as overburden and plant tailing would be available to the landfill as cover material. In addition, mining excavations within the perimeter of the landfill would increase the availability of the landfill. If both the landfill development and mining operations were to occur, operation and maintenance costs such as the railroad, haul roads, electrical and water distribution systems, and maintenance and warehousing facilities could be shared. Other more remote mineral resources located to the west are not expected to be adversely impacted by the landfill.

Mitigation

Sequencing of the landfill operations will allow ample time to mine existing iron ore resources if they prove to be economical in the future. No other mitigation for making the project compatible with existing land uses is necessary.

Significance After Mitigation

Impacts on resource production uses are not considered to be significant, based upon the phasing attributes of the project. Thus, implementation of the proposed action would not be incompatible with existing land uses and would not result in a significant impact.

b. Reduced Landfill Operations Alternative

Impact

This alternative would result in the same type of impacts discussed above for the proposed action, but at a lesser scale of magnitude.

Mitigation

Mitigation is not determined to be necessary.

Significance After Mitigation

Impacts on resource production uses are not considered to be significant, based upon the phasing attributes of the project. Thus, implementation of the proposed action would not be incompatible with existing land uses and would not result in a significant impact.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would have essentially the same land use impacts as the proposed action.

Mitigation

Mitigation is not determined to be necessary.

Significance After Mitigation

Impacts on resource production uses are not considered to be significant based upon the phasing attributes of the project. Thus, implementation of the proposed action would not be incompatible with existing land uses and would not result in a significant impact.

d. No Action Alternative

Impact

With this alternative there would be no landfill development, and no impacts would occur.

Mitigation

No mitigation would be necessary, as no impacts would occur.

Significance After Mitigation

No significant issues would result.

2. Compatibility with Surrounding Land Uses

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if the proposed action presents a conflict with surrounding land uses in the Eagle Mountain community area.

a. Proposed Action

Impact

The project is expected to have no adverse impacts on currently active mineral resources exploration or mining in the area. Also, compatibility with residential, agricultural, or commercial land uses located in the Chuckwalla Valley around Desert Center or Lake Tamarisk is not considered a potentially significant issue because the nearest residence in Lake Tamarisk is nine miles and in Desert Center over ten miles.

Nevertheless, the project raises land use compatibility considerations of two types. The first is compatibility of the project with existing residential and correctional facility uses in the Eagle Mountain townsite. The second is its compatibility with existing open space and recreational uses on surrounding lands.

The first compatibility consideration involves the proximity of existing residential and correctional facility uses to the project and its anticipated noise, light and glare, traffic, litter, dust, and associated impacts. The existing return-to-custody facility is approximately 150 feet from the Eagle Mountain rail line at its closest point and approximately 1,200 feet from the Phase I container handling/maintenance and repair facility. Only the Phase I level of operations (two train trips per 24-hour day) would affect the RTCF. This would not represent a significant noise impact. When the Phase I container handling facility is moved to the Phase II container handling facility location, the maintenance and repair facility would continue to operate. Train operations at the repair and maintenance facility would be limited to no more than one train arrival and departure per day. Arrivals and departures would be limited to daytime hours. This would not represent a significant noise impact to the RTCF.

The landfill itself is planned to be 2,000 feet north and west of the closest part of the townsite and partially screened by the existing coarse tailing hill. Rail and truck access would be through or adjacent to the townsite, as would the processing area on the south rim of the East Pit. Solid waste handling and transportation would utilize equipment similar to that used during mining, but in fewer numbers. The landfilling itself is planned to occur at the west end of the site and below the rim of the East Pit for the first few decades of operation. As the landfill progresses, it will be elevated several hundred feet above the rim and the tailing hill will be lowered as it is used for cover material. Eventually, the working face of the landfill will be directly in view from the townsite. Treatment of the interface area along the south edge of the project is a key consideration of land use compatibility with the townsite uses.

The second compatibility consideration involves how the project would relate to existing open space and recreational uses of surrounding lands. Impacts of project-generated noise, light and glare, litter, and dust are discussed in Section IV.L., Noise, and Section IV.J., Visual, Recreation, and Wilderness Resources. These impacts are not deemed to be significant based on project location, which contains their effects, and project operational measures.

Mitigation

Land use incompatibilities with residential and correctional facility uses are anticipated to be mitigated to a level of insignificance by observance of development standards applicable to landfill planning areas immediately adjacent to the townsite. The standards include the following measures:

1) Restricting truck traffic bringing waste to the site and other heavy-duty vehicles to the proposed haul road only. Such truck and heavy-duty traffic shall not be permitted to use roads through the town of Eagle Mountain.

2) All buildings associated to the landfill shall have a minimum setback of 25 feet from the property boundary.

3) The height of all landfill structures, including buildings shall be no greater than 60 feet.

4) Views into the working areas shall be partially obscured by existing berms of coarse tailing materials or overburden for several decades.

5) Dust from excavation of the tailing piles shall be controlled as needed with the use of water trucks.

Measures to reduce the specific adverse impacts upon adjacent open space uses are addressed within the discussions of the identified impact topics.

Significance After Mitigation

Incompatibilities with residential and correctional facility uses are anticipated to be reduced to less than significant levels by mitigation measures listed above and implemented in the SP for the landfill. Land use incompatibilities associated with surrounding open space and recreational uses are not anticipated to be significant based on mitigation measures incorporated into the project and described in Section IV.L., Noise, and Section IV.J., Visual, Recreation, and Wilderness Resources.

b. Reduced Landfill Operations Alternative

Impact

Impacts would remain essentially the same as identified for the proposed action, although they would be reduced in intensity.

Mitigation

The same mitigation measures recommended for the proposed action would apply.

Significance

Incompatibility issues would be essentially the same as for the proposed action, but they would be reduced to levels of insignificance by the recommended mitigation measures.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would have essentially the same impacts as the proposed action, but with the reduction of traffic impacts and incrementally more intense rail-related impacts.

Mitigation

The applicable mitigation measures would be the same ones recommended for the proposed action.

Significance

Incompatibility issues would be reduced to levels of insignificance by the mitigation measures recommended above.

d. No Action Alternative

Impact

The site would remain in its present state, and no land use impacts would occur.

Mitigation

No mitigation is deemed necessary in this case.

Significance

No land use impacts would occur, and no incompatibility issues would arise.

3. Consistency with Plans and Policies

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if the proposed action or project presents a conflict with existing plans and policies of the County of Riverside, the Bureau of Land Management, the National Park Service, or the Metropolitan Water District.

County of Riverside

The project would not have a significant adverse impact on existing County land use plans, assuming a finding of consistency with the Comprehensive General Plan. Currently, the proposed action is not consistent with the General Plan Open Space and Conservation Map land use designation of Mineral Resources for the East Pit area. The project is also not consistent with the text policy for the Eagle Mountain area, which proposes open space uses and possible reactivation of mining uses but which makes no mention of landfilling the East Pit. In addition, the existing zoning designations do not permit the proposed landfill on the site.

Because of these General Plan map and text policies, as well as the lack of conducive zoning permitting the landfill and establishing standards for its operation, the project includes a General Plan Amendment, application of a change of zone to the SP zone designation, and preparation of a Specific Plan.

Given these amendments, this proposal does not appear to be in serious conflict with any other general goals, standards, or policies of the General Plan. The project would be potentially consistent with the Desert and Mountainous Areas designation which surrounds the East Pit area, as well as the Category III designation of the townsite area. The townsite meets the locational, water and sewer, and circulation policies of a Category III land use; however, the existing dwelling units have been constructed at a density greater than that allowed for Category III land uses. Landfills are permitted in this land use category.

The Eagle Mountain townsite is not a part of the project. A separate specific plan will be developed for the townsite at a future date. Actual consistency determinations need to be made by the County after their review of the Eagle Mountain townsite specific plan and its compliance with the general environmental goals stated in the General Plan.

Concerns about the relationship of existing residential units to the landfill have been noted in the previous section. Since existing plans and policies promote very low residential densities and compatible land uses surrounding the project site, this impact would not be accentuated in the future and the findings concerning absence of incompatible land uses could be made, as required by the CoSWMP.

Future (post-closure) land uses of the site have not yet been determined. At present, it is anticipated that the inactive landfill would be developed for passive recreational or open space uses which would be compatible with recreational and open space uses existing and anticipated in the surrounding area.

Bureau of Land Management

The project is not anticipated to have any significant adverse land use impacts upon the CDCA Plan or other BLM plans and policies. The land exchange will divest the BLM of reversionary interest in the Eagle Mountain townsite and exchange lands in the project area for biologically valued lands along the Chuckwalla Bench and within the Salt Creek acquisition area. The project is in keeping with the intensity of use prescribed for the project vicinity by the M and I land use classifications of the CDCA Plan. The project is in keeping with the multiple use class guidelines (BLM 1980:Table 1).

Under the classification guidelines, the proposed use of the rail and road rights-of-way to serve the project does not conflict with BLM plans, policies, and programs. Impacts from the use of rail on desert tortoise habitat in the Chuckwalla Bench is presented in the biology section.

The project's effects upon the BLM boundary modifications proposed to incorporate land to the south and west into Joshua Tree National Monument would present a potentially significant land use conflict, especially if the Eagle Mountains alternative is selected and the land adjacent to and including the western edge of the project area is transferred to the NPS for inclusion into the national monument. The impact is somewhat mitigated by the fact that the part of the project area in question is a buffer area under the SP and that it would be managed as an open space resource as part of the project's perimeter.

National Park Service

The proposed action is not anticipated to conflict with the use of Joshua Tree National Monument within the Natural Environment or Wilderness subzones. These portions of the monument in proximity to the project site are only accessible to backpackers during the winter. Summer temperatures are too extreme to permit recreational access. Lighting from past mining activities was visible to hikers. Although the applicant is not proposing nighttime landfill operations except for the unloading facilities, such lighting and security lighting from the landfill could be visible (a further discussion of this impact is contained in Section IV.J., Visual, Recreation, and Wilderness Resources). Because of the distance of mining/landfilling operations and the depth of the pit in providing a natural berm, project noise is not anticipated to be audible in the monument (see Section IV.L., Noise). Regarding the project's relationship to plant and animal life within the monument, see the biology section of this draft EIS/EIR.

Metropolitan Water District

The MWD Colorado River Aqueduct and pumping station are not expected to be adversely impacted by the project. Although the aqueduct is uncovered northeast of the project site, water contamination by any measurable quantity of airborne dust or litter is not considered likely based upon operations procedures incorporated into the project to mitigate these impacts (see the Visual, Recreation, and Wilderness Resources section of this draft EIS/EIR).

a. Proposed Action

Impact

Impacts on plans and policies of the agencies mentioned above are generally not expected to be significant, assuming findings of consistency and amendments as proposed. Existing and proposed NPS and BLM plans for wilderness and recreational uses of the Pinto Basin and Eagle Mountains north and west of the project site are not anticipated to be significantly impacted by the project. No deterioration of wilderness values of designated wilderness areas are anticipated based upon the distances from the landfill to wilderness boundaries and mitigation measures to reduce noise, light and glare, and litter and dust impacts.

Mitigation

The proposed action includes a County General Plan Amendment, zone change, Specific Plan, and BLM/Kaiser land exchange. Upon implementation, consistency with agency plans and policies is expected, and therefore, impacts are considered insignificant.

Significance After Mitigation

Impacts on plans and policies of the affected agencies are generally not expected to be significant, assuming findings of consistency and amendments as proposed.

b. Reduced Landfill Operations Alternative

Impact

Impacts on agency plans and policies would be essentially the same as in the proposed action.

Mitigation

Mitigation measures would be the same as for the proposed action.

Significance After Mitigation

Impacts on plans and policies of the affected agencies are generally not expected to be significant, assuming findings of consistency and amendments as proposed.

c. Proposed Action with Rail Access Only Alternative

Impact

Impacts on agency plans and policies would be the same as those of the proposed action.

Mitigation

Mitigation measures would be the same as for the proposed action.

Significance After Mitigation

Impacts on plans and policies are considered to be insignificant.

d. No Action Alternative

Impact

No changes to existing land uses would occur. Existing land uses are considered to be consistent with all agency plans and policies, so this alternative would have no adverse impacts.

Mitigation

No mitigation measures would be necessary.

Significance After Mitigation

No land use impacts would occur, and no incompatibility issues would arise.

4. Collection/Transfer Stations and Rail Transport Land Use Compatibility

New and existing transfer and collection stations will be located throughout the wasteshed area. Since their exact locations to serve the Eagle Mountain landfill are unknown at this time, specific existing land use conditions and impacts associated with this aspect of the project are not addressed. The siting of each facility will be the subject of land use, zoning, and environmental review and approvals by the affected local agencies. In general, these stations are expected to be located in conjunction with existing landfill or recycling facilities or on new sites on or near rail lines. These facilities could require up to 30 acres and be enclosed within a structure as large as 100,000 square feet. Potential land use considerations include comparability with existing and planned surrounding uses, which involves evaluation of noise, odors, dust, visual impacts, increased truck and rail traffic, and other site-specific impacts.

Land use impacts along the rail corridors that would be used to transport the solid waste to the site are anticipated to be negligible and are determined to be insignificant. This is based upon the fact that rail lines are existing and represent established land use relationships that would not be adversely affected by the minor increase in train traffic anticipated for any specific rail line. Other specific impacts along the rail line network, such as traffic and noise, are addressed separately in this draft EIS/EIR.

F. Surface Drainage/Flooding

Assumptions and Assessment Guidelines. The Eagle Mountain area is subject to flash flooding in the desert alluvial fans and washes. For the following environmental analysis, surface drainage impacts will be considered significant if the proposed project alters surface drainage patterns to such an extent as to result in increased runoff and erosion and in flooding and flood-related hazards. Impacts would also be considered significant if the project were to be in violation of the policies of the Riverside County Flood Control District.

1. Proposed Action

Impact

The total watershed area, in terms of size, would be largely unchanged from pre-landfill to post-landfill conditions, and the total flow generated from a given size storm would remain unchanged. However, the reclamation of the East Pit by the disposal of solid wastes would reestablish drainage patterns that existed prior to mining operations. Runoff currently flows into the pit and would either percolate into the ground or evaporate. In the future, runoff from the landfill would flow in reestablished natural drainage courses to the alluvial areas to the east of the Phase II handling area where it would percolate or evaporate.

The peak flow rate calculated for the final landfill contours may decrease with time due to settlement. Since the landfill surface will flatten with time, the flow velocity will decrease. Decreased flow velocity means increased time of concentration, which produces a reduced peak flow rate at downstream points.

Upon implementation of landfilling operations, storm flows will be diverted around the East Pit. If the water is conveyed around the landfill, drainage impacts to the area east of the site are possible. These could include flooding, erosion, and debris deposition.

Without incorporating adequate drainage measures, there is a possibility that the southeasterly drainage flow pattern could be reestablished as flows are diverted around the landfill. This would increase the potential for flooding of the town. Sheet flows across the existing maintenance facility, rail line, and Yucca Drive could be expected. Flooding damage at residences along Yucca Drive is also possible. Although Kaiser Road provides an alternate access to the areas served by Yucca Drive, Kaiser Road is subject to washout at the fork of the two roads.

The area east of the landfill site may be impacted due to concentrated flows at the northern toe of the landfill. These flows could enter the flat eastern area at higher velocities than pre-landfill conditions. Therefore, potential impacts include erosion and effects to plant and animal wildlife. Similar impacts may result if storm water is concentrated along the southern toe of the landfill.

As the specific plan outlines, the drainage plan would provide two landfill perimeter drains and an improved drainage system through the town, so that upstream drainage will be conveyed past the landfill and town areas to a point where it can be safely discharged into the natural flow paths downstream. The southern toe of the landfill is designed outside of and above the 100-year floodplain limits. Openings would be constructed at the two blocked sections in Eagle Creek: one at the mouth of the main confluence and one at the creek neck just downstream of the main confluence (see Figure 56). These openings would be sized to pass the runoff from a 24-hour, 100-year rainfall frequency event.

The northern perimeter drain would be a lined open trapezoidal channel which collects flows from the landfill surface and northern canyons tributary to the landfill toe. The southern perimeter drain would also be a lined open trapezoidal channel that would collect flows from the landfill surface only.

The permanent southern channel would be approximately 18,500 feet long, and the northern perimeter channel would be approximately 16,500 feet long. The channel bottom width would be 20 feet and the top width would vary from 26 to 40 feet (see Figure 27). The depth of flow in the channel would range from less than one foot to approximately four feet. Both channels would be sized to contain runoff from a 24-hour, 100-year rainfall frequency event, plus a two-foot freeboard allowance. The permanent drainage system for the diversion of storm water from the refuse fill will be constructed in stages to protect areas which reach final elevations.

Both landfill drains would discharge east of the site through wing-walled energy-dissipating outlet structures. The flow velocities would be reduced to noneroding conditions.

The proposed private/public land exchange alone would not have a direct effect on the drainage in the project area because development would not be a factor. Improvements to the Eagle Mountain Road and extension and the Eagle Mountain rail line are planned as part of the proposed action. These improvements would be designed in accordance to the development standards stated in the specific plan (September, 1990), which includes compliance with the requirements of the September 1984 MOU between Riverside County, the Riverside County Flood Control District, and the Water Conservation District as well as with the requirements of the California Regional Water Quality Control Board.

The relevant regulatory stipulations to be complied with by the proposed landfill include the state (Title 14 of the California Code of Regulations) and federal (RCRA Subtitle D, the "open dump" criteria) regulations requiring that the landfill be protected from flooding or washout from a 24-hour, 100-year storm. Further, CCR, Title 23, Chapter 15, regulations require a minimum final slope to facilitate drainage and hence minimize infiltration of water into the landfill and subsequent potential degradation of groundwater quality.

Thus, a complete perimeter drainage system (see Figure 27) would be installed to collect drainage which would otherwise run onto the site. This drainage will be directed around the landfill for discharge to the alluvial areas to the east. The final landfill slope would meet the Chapter 15 minimum of three percent.

As the site filling progresses, temporary drainage control measures would be utilized to prevent run-on from reaching areas of waste deposition or active fill areas. These temporary measures would be incorporated into the site operational plan and subject to review by the regulatory oversight via the state's periodic review process.

Mitigation

Potential impacts to surface drainage would be avoided due to the incorporation of the project design features, which include a design plan consistent with the stipulations of the County Flood Control District. In addition, the final landfill slope would be a minimum of three percent.

Significance After Mitigation

The proposed action would not result in any significant impacts to surface drainage or flooding.

2. Reduced Landfill Operations Alternative

Impact

The potential drainage impacts of this alternative would be similar to those associated with the proposed action.

Mitigation

No mitigation would be required other than the measures incorporated into the project design.

Significance After Mitigation

No significant impacts to surface drainage or flooding would result.

3. Proposed Action with Rail Access Only Alternative

Impact

The drainage impacts of this alternative would be the same as those associated with the proposed action.

Mitigation

No mitigation would be required other than the measures incorporated into the project design.

Significance After Mitigation

No significant impacts to surface drainage or flooding would result.

4. No Action Alternative

Impact

Under this alternative, the existing conditions would not change, and drainage from upstream areas would continue to flow to the East Pit. Culverts would continue to fill with sand. The Kaiser Truck Trail would continue to erode, and portions of the railroad could wash out.

Mitigation

No drainage impacts would occur, and no mitigation would be needed.

Significance After Mitigation

No significant impacts would occur.

G. Biological Resources

The following section is divided into subsections listing the most sensitive biological issues first. The subsections describe the impacts, mitigation, and effects of each alternative to sensitive biological resources found or potentially occurring on the site. These subsections are:

- Desert tortoise
- Nelson's bighorn sheep
- Desert pupfish
- Other sensitive wildlife
- Sensitive plant species
- Major washes and drainages

1. Desert Tortoise

Assumptions and Assessment Guidelines. Impacts to desert tortoise were determined to be significant or insignificant based upon the sensitivity of the species on the various portions of the project site and the legal requirements governing mitigation of impacts such as the federal and state Endangered Species Acts. Impacts to tortoises were considered *take* under the federal Endangered Species Act, which is defined as actions which ". . . harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. 1538 [1973]). Habitats supporting tortoises or falling within any of the three categories for desert tortoise management by BLM were considered significant resources. All impacts to tortoises and their habitat (including BLM categorized lands) were considered significant unless the impact could be determined not to cause a detrimental effect on the survival of individual tortoises or their populations. The potential for various types of impacts to occur to desert tortoises exists. These potential impacts include injuries or deaths from collisions with trains and trucks, loss of habitat, vandalism to tortoises and their habitat, increased predation by ravens, reduction in habitat quality, accidents and burial during construction, impairment of physical and reproductive functioning, and population fragmentation.

Information used to determine impacts to tortoises include field survey results, published literature, biological assessments, agency reports, and personal conversations with desert tortoise experts.

a. Proposed Action

Impacts

A summary of the impacts to tortoises is included in Table 40. Significant impacts to desert tortoises in the project area and significant potential cumulative impacts to the tortoise

TABLE 40
SUMMARY OF SIGNIFICANT IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES AND THEIR MITIGATION AT THE EAGLE MOUNTAIN MINE PROJECT

Species	Impacts	Significant Habitat (acres) Impacts	Mitigation
		LISTED SPECIES	
Desert tortoise	Permanent loss of individuals and habitat, increased raven predation, harrassment of individuals (noise and vibration)	150	Preoperation surveys, monitoring, raven control plan, rail and road barriers and culverts, employee education, off-site habitat preservation (375 ac)
Desert pupfish	Potential loss of individuals and habitat, degraded habitat	<1	Monitoring program, emergency accident plan, construction design modifications
		OTHER SENSITIVE SPECIES	
Foxtail cactus	Loss of many individuals at mine, storage	158.3	Transplant program designed to relocate individual Alverson's foxtail cactus to areas to be rehabilitated within the proposed landfill site
Bat species*	Potential loss of roosting areas, hibernacula		Monitoring of bat roost sites, and maintenance of adit opening
Nelson's bighorn sheep	Loss of 4 water sources, loss of habitat, stress from noise and other human activity	994	Create and enhance off-site water sources, monitoring program, on-site habitat preservation (644 acres)
Eagle Mountain scrub jay	Possible increased raven predation on nestlings	371	Raven monitoring and control program

*See text for description of species.

population in the Chuckwalla Valley will occur with the implementation of the landfill at Eagle Mountain. Impacts include loss of individuals and habitat, harassment, population fragmentation, and potential increased raven predation.

Desert tortoises currently occupy habitat immediately adjacent to and sometimes within the Eagle Mountain railroad bed. Because of this, impacts to desert tortoises could occur with the resumption of maintenance and regular rail service. Maintenance and restoration to prepare the rail line for service will consist of minor repairs and replacement of segments of rail and ties and cleaning out culverts which pass water under the railroad bed. These activities could affect tortoises by burying them in burrows within the railbed and burying unoccupied burrows. Unoccupied burrows are an important resource for tortoises because they move from burrow to burrow and use the burrows to escape inclement weather. These impacts will be temporary and will occur periodically along 10 miles of railroad through BLM Category 1 desert tortoise habitat, 18 miles of Category 3, and 24 miles of uncategorized habitat.

During routine maintenance activities along the railroad, the storage of equipment and material, parking of vehicles, and other staging activities would be confined to previously disturbed areas at Ferrum Junction, Red Cloud, and Summit. Thus, no impacts are anticipated from materials storage.

Reintroduction of rail traffic on the Eagle Mountain rail line would likely cause the loss of a small number of tortoises due to train kills. Tortoises will occasionally attempt to cross railroad tracks, thus increasing their chances of a fatal train encounter. The loss of tortoises from train kills would be a significant impact.

Significant impacts to desert tortoise habitat will occur with improvements and widening of Eagle Mountain Road and with the building of the extension of Eagle Mountain Road and the rail spur. Eagle Mountain Road will be widened from its current width of 20 feet to 40 feet, within a 110-foot-wide right-of-way. These road improvements will be carried out over a seven-mile length of the right-of-way, from I-10 north. Assuming a worst-case scenario, where the entire right-of-way is disturbed, 76.4 acres of Category 3 tortoise habitat would be lost. The Eagle Mountain Road Extension and rail spur are a continuation of the Eagle Mountain Road 110-foot-wide right-of-way. The proposed 40-foot-wide road extension follows a current 15-foot-wide dirt road for 3.5 miles and creates a totally new road for 2.5 miles, where it ends at the Phase II handling yard. The new rail spur is also within this proposed 110-foot right-of-way for its final 2.5 miles. Again, assuming that the entire 110-foot right-of-way will be disturbed, a total of 73.6 acres of tortoise habitat would be lost. Therefore, for all road improvements and road and rail construction, a total of 150 acres of Category 3 desert tortoise habitat would be permanently removed by the project (see Table 40). An increase in the potential for desert tortoise road kills will occur from the increased truck traffic on Eagle Mountain Road. Such road kills are likely to reduce tortoise densities for a distance of one-quarter to one-half mile on both sides of the road, unless effective barriers are placed along the road in all areas where tortoises occur.

Indirect impacts to tortoises may occur if landfill operations promote an increase in the local raven population. Ravens are scavengers, usually depending on carcasses of native animals for food. The landfill could potentially provide a large food source for the ravens and the raven population could respond by increasing. Ravens are known to prey on juvenile tortoises, and an increased raven population may result in more deaths in this juvenile segment of the tortoise population within the project area and within the nearby Chuckwalla Bench area where tortoise populations are high.

Other potential indirect impacts resulting in losses to tortoises include physiological impairment due to the effects of noise and vibration along the active rail line, as well as population fragmentation. Recent evidence (see Appendix F) indicates that tortoises are very tolerant of noise and vibration from railroad activity. Active tortoise burrows have been found in significant numbers in the berms of active rail lines (over 20 train passages per day) in the Mojave Desert of California. Therefore, significant impacts to tortoises from noise and vibration are not expected. The resumption of rail operations may restrict tortoise movement across the tracks or in the immediate vicinity of the tracks. If movement of reproductively active tortoises is restricted by the tracks, gene flow and long-term population viability within the Chuckwalla population could be threatened.

Mitigation

Impacts from displacement and habitat loss along the truck route will be reduced to below a level of significance by a combination of permanent preservation of high-quality habitat within the area, and other measures outlined below. Other significant impacts to desert tortoises will be reduced to below a level of significance by incorporating mitigation measures in this section. All mitigation measures will be incorporated into a Section 7 consultation and U.S. Department of the Interior (DOI), Fish and Wildlife Service, Biological Opinion and CDFG 2081 MOU for implementation.

Preconstruction Survey and Monitoring. Repair and replacement of all permanent structures or features, such as railroad tracks and culverts, within tortoise habitat will be monitored by a qualified biologist. A preconstruction survey will be conducted prior to maintenance and construction activities and immediately prior to regular railroad and roadway use. Desert tortoise population monitoring programs will be conducted to determine the level of impacts caused by railroad and road operations. Monitoring will begin approximately one year prior to rail and road service and will continue throughout the life of the project or until the USFWS and BLM deem further monitoring unnecessary.

Excavation of Tortoise Burrows and Translocation of Tortoises. Tortoise burrows in the railroad berm will be located and monitored during the repair and maintenance phases of track preparation. Tortoises, either aboveground or in burrows, found to be threatened by track rehabilitation activities will be translocated to a place at least 300 feet from the rail corridor, but on the same side of the tracks. This translocation distance would likely keep the tortoise within its home range, thus increasing its chances for survival. The handling and removal of tortoises will be conducted by a qualified biologist approved by USFWS and BLM.

Culvert System for Tortoise Movement under the Railbed and Eagle Mountain Road. A system of culverts and other structures will be placed under the railbed to allow tortoises to cross under the railroad. Existing culverts will be made appropriate for tortoise use by placing the culverts level with the desert floor on both ends and covering the bottoms with soil. Additional culverts will be placed in areas to be determined by the baseline tortoise surveys and decided by BLM and USFWS. A system of culverts and other structures will also be built under Eagle Mountain Road. The road system's culverts will be based on the same plans as the railroad culvert system. The effectiveness of these crossings as passages for tortoises will be monitored concurrently with the tortoise population and raven monitoring programs. The culvert system would reduce potential impacts of population fragmentation to a level below significance.

Desert Tortoise Protective Barriers. Desert tortoise protective barriers, as described in the mitigation plan (see Appendix F), will be placed on each side of the railroad tracks in high tortoise density areas. Barrier designs and placement will be approved by USFWS. All of Eagle Mountain Road within desert tortoise habitat will be provided with barriers. Barriers will also be designed to guide tortoises to culverts. These barrier/culvert systems would reduce impacts from train/truck kills to a level below significance.

Dedication of Habitat for Open Space and Conservation. Habitat lost due to widening of Eagle Mountain Road and construction of the road extension and rail spur will be mitigated by the purchase of 375 acres of desert tortoise habitat for transfer to permanent BLM ownership. The number of acres of compensation is based upon the BLM's habitat compensation formula (calculated as 2.5:1). The exact parcel(s) to be purchased for compensation will be selected by BLM.

Raven Control and Monitoring. To minimize impacts by ravens, the raven population will be controlled. A raven population monitoring program will begin approximately one year prior to the beginning of landfill operations and continue throughout the life of the project or until the federal agencies determine that it is no longer necessary. A passive raven control program will be introduced as soon as the landfill begins operation to avoid raven predation problems as early as possible. Passive control will include daily trash burial at the end of each workday, and other nonlethal measures to minimize raven feeding at the project site. These measures may include conditioned taste aversion, raven nest destruction, perch site reduction, and other measures developed in consultation with BLM, USFWS, and CDFG. In addition to these actions, the feasibility of closing the Desert Center landfill is being investigated. This county-operated refuse dump is currently used by several ravens, and its closure would remove one local source of food material. If, through the monitoring program, the raven population is found to be increasing, an active raven control program (raven destruction) will be initiated with prior approval from BLM and USFWS. A detailed raven control plan, plus the appropriate permits, will be developed and in place before landfill operations begin. All programs will be undertaken in conjunction with USFWS, BLM, and CDFG and with the Raven Management Plan for the California Desert Conservation Area (BLM 1990). If possible, this program shall be developed with the cooperation of Joshua Tree National Monument.

Worker Education Program. A worker education program will begin before implementation of the landfill operation. The program shall emphasize the legal protections afforded sensitive species and measures to minimize impacts to those species and their habitats. The program will include a handbook outlining the details of the protections and measures to be followed by each employee. The program will be extended to contracted truck drivers delivering solid waste to the project site, to increase awareness of potential desert tortoise occurrence along Eagle Mountain Road and to receive any reports of tortoise sightings or road kills for prompt removal.

Significance After Mitigation

All temporary and permanent impacts to the desert tortoise and/or its habitat will be reduced to below a level of significance by incorporating the mitigation measures described above.

b. Reduced Landfill Operations Alternative

Impacts

Impacts to tortoises will remain the same as the proposed action.

Mitigation

Mitigation measures are the same as those listed above for the proposed action.

Significance After Mitigation

Mitigation measures will reduce significant desert tortoise impacts to a level below significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

Potential impacts to tortoises from incidental road kills will be reduced by eliminating truck traffic on the Eagle Mountain Road. Permanent impacts to 150 acres of Category 3 tortoise habitat will be avoided and individual losses due to the Eagle Mountain Road construction will not occur. Impacts to tortoises from predation will be reduced because fewer road kills to be scavenged by ravens and other predators will occur, thus reducing the level of attraction for these birds to the site. Significant impacts similar to the proposed action remain due to landfill operation and railroad service.

Mitigation

No permanent desert tortoise habitat will be lost because Eagle Mountain Road will not be widened. Mitigation measures are the same as those listed above for the temporary impacts remaining along the railroad and the impacts associated with the landfill operation.

Significance of Mitigation

Mitigation measures will reduce significant desert tortoise impacts to a level below significance.

d. No Project Alternative

Impacts

No significant impacts will occur to desert tortoises.

Mitigation

No mitigation measures will be required.

Significance

The No Project alternative will not result in any impacts to the desert tortoise.

2. Nelson's Bighorn Sheep

Assumptions and Assessments Guidelines. Impacts to Nelson's bighorn sheep were determined to be significant or insignificant based upon the sensitivity of the species to disturbance and its legal status, as designated by the BLM and the CDFG. Loss of habitat, especially water sources, was considered a significant impact. Also, indirect human-caused impacts such as noise, poaching, exposure to disease, and harassment were also considered potentially significant, with the level of significance depending upon the intensity of the impact.

a. Proposed Action

Impacts

Potential impacts to Nelson's bighorn sheep at the mine site will occur from loss of habitat and water sources, which could lead to stressful conditions within the sheep population and a reduction in habitat quality. Increases in the residential uses in the Eagle Mountain due to the increased employment opportunities provided by the project could also lead to indirect effects on bighorn sheep such as more exposure to human activity (including poaching), dogs, and domestic livestock. A summary of impacts is included in Table 40.

Certain features of the project will reduce the chance of sheep exposure to the landfill operation and minimize the impacts. Unlike an open unattended dump in the desert, where activity is low and sheep might frequent, the proposed landfill will be extremely active and the sheep are not expected to range close to the activity. Refuse at the site will be compacted by specialized equipment and covered with soil on a daily basis. No exposed refuse will be available to attract the sheep.

Three permanent and one temporary water source within the project boundary would be lost. One permanent water source to be lost is a pond created as part of the mining operation at the bottom of the East Pit. This water source is the least used and lowest quality of the permanent water sources in the project area. Two leaking water tanks on the south-central portion of the site are also currently used by bighorn sheep, but will be removed. The temporary source, a large depression which fills with rainwater, is located in the northeastern portion of the proposed action.

Impacts to bighorn sheep will occur with the loss of approximately 994 acres of previously undisturbed natural lands considered prime sheep range (Weaver, pers. comm. 1990; Armentrout, pers. comm. 1990). Much of this habitat is on public-selected lands on the landfill site. The component of sheep habitat that is limiting the population in the Eagle Mountains is available water, not forage. There is an abundance of foraging habitat in the Eagle Mountains, but what makes the area around the landfill site significant is the presence of permanent water. Loss of habitat forces sheep to use smaller areas around remaining water sources and may create more stressful conditions, which could lead to disease or decreased reproductive success. A few sheep bedding areas located within the perimeter of the landfill will be impacted as well.

Activity in the landfill site will cause impacts to bighorn sheep even though they may habituate somewhat to activity, as long as they are not threatened. Long-term impacts to sheep populations in proximity to activities such as the landfill cannot be determined. During past mining operations, bighorn were still active in the mine area despite noise and human activity. Loss of the disturbed portions of the Eagle Mountain Mine site are not considered significant, except to water sources and bedding areas, since those areas do not now offer foraging habitat for the sheep.

The project will introduce 160 employees to the area and some employees would be expected to live in the Eagle Mountain Mine townsite. Indirect impacts to sheep may occur by the increase in activity around the townsite, including harassment by dogs and exposure of sheep to livestock-related diseases (Armentrout, pers. comm. 1990). Impacts may occur to sheep with increased access for humans to the Eagle Mountains.

No significant impacts to bighorn sheep are expected to occur along the railroad corridor. The habitat is not prime sheep range and is a long, narrow strip. Only one case of rail death has been observed in California (Bleich, pers. comm. 1990), and therefore, sheep are not expected to be directly injured or killed by moving trains. A significant impact could occur if sheep movement between ranges is disrupted by regular rail operation. Sheep populations in the Chocolate and Orocopia mountains could be affected by restricted gene flow if the sheep refuse to cross the rail line. However, this scenario is not expected to occur. Bighorn sheep corridors are shown in Figure 89 (BLM 1980).

Mitigation

Mitigation measures are designed to eliminate attractiveness of the proposed landfill to bighorn sheep and to compensate for the loss of habitat. Other mitigation measures may be required based on the results of monitoring and further studies which will analyze the effects of landfill operations on bighorn sheep.

Monitoring Study. A two-year monitoring study will be conducted to assess bighorn sheep movements in the vicinity of the Eagle Mountain landfill site. Approximately 17 sheep, mostly ewes, will be radio-collared and tracked by telemetry to gauge home range sizes of bighorn. Monitoring will begin at least one year prior to the beginning of landfill operations. The goal of the monitoring study is to identify new locations to place permanent water sources.

Installation of Permanent Water Sources. The loss of three permanent water source and one temporary water source is considered a significant impact. Three new permanent water sources, ensuring year-round water availability, will be placed far from the mine site to encourage bighorn sheep to use the surrounding natural areas rather than the project site. These water sources will compensate for the loss of the three permanent water sources. The sites for the water sources and their design will be located and approved by biologists at BLM and CDFG. In addition, Buzzard Springs will be rehabilitated and cleared of tamarisk, which will compensate for the loss of the temporary water source. As discussed above, monitoring of

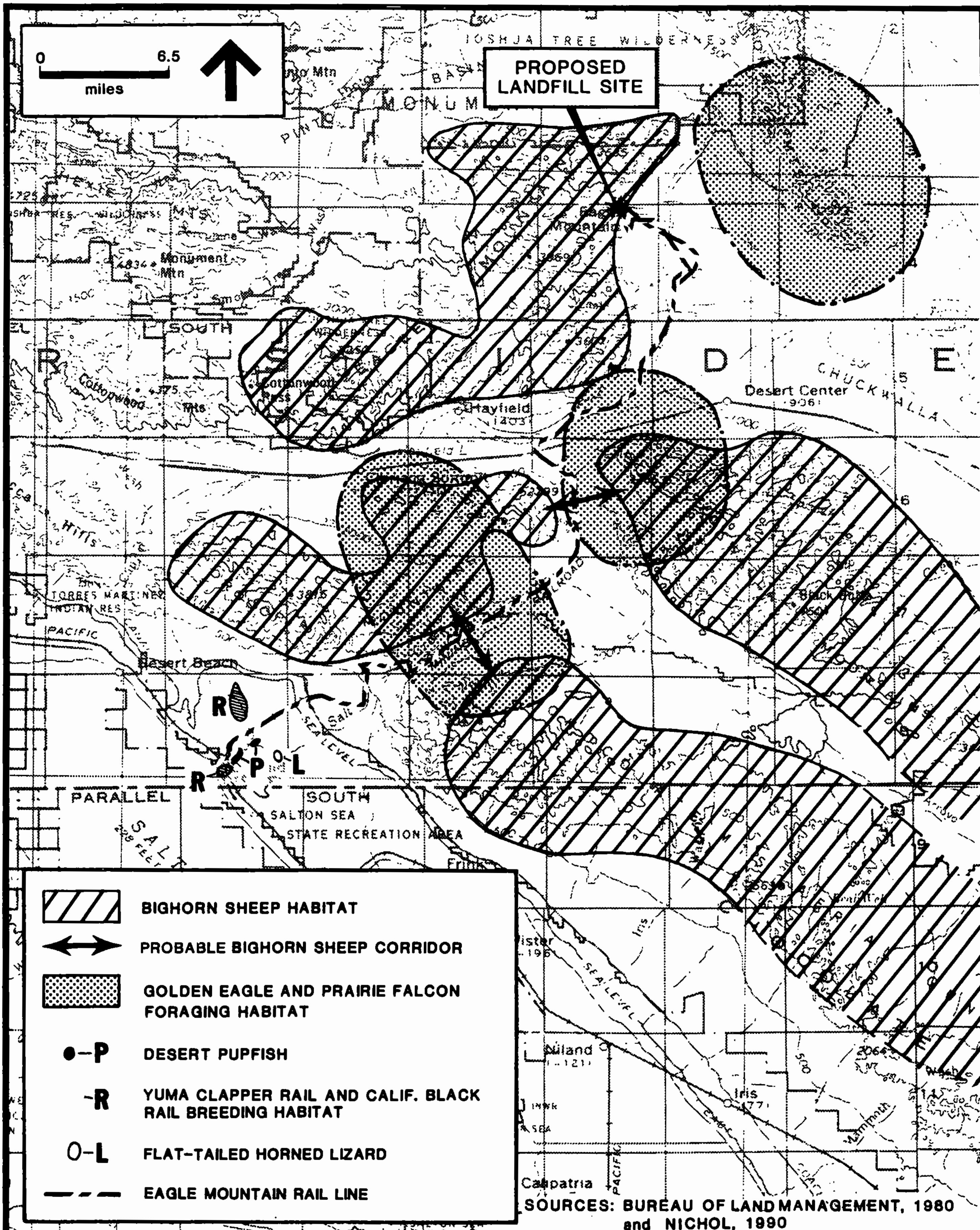


FIGURE 89. HISTORIC RECORDED DISTRIBUTION OF SOME WILDLIFE SPECIES OF SPECIAL CONCERN

RECON

sheep movements will be conducted to determine utilization of new water sources by bighorn sheep. The new water sources will be placed, if possible, within ewe home ranges, but sufficiently removed from the landfill area to significantly reduce or eliminate the noise and human activity–related impacts from the landfill operation. Before old water sources are removed, the newly created sources will have to show evidence of use. New water sources will be placed in habitat at least one year before current water sources are removed to enable sheep to habituate to the new water sources. If sheep are not found to naturally expand their ranges to incorporate the new water sources, they will be translocated to the new water sources to encourage the incorporation of these sites into their home ranges.

Expanding sheep range into areas remote from the landfill will decrease the chance of stress-related illnesses and of contact with domestic sheep. To prevent the spread of sheep-borne disease to the bighorn population, domestic sheep should not be allowed on the Eagle Mountain site.

Other Preservation of Habitat. Approximately 644 acres of high-quality bighorn sheep habitat on-site will be preserved within the open space buffer areas surrounding the landfill (see Figure 89). Most of this habitat is currently located on public-selected lands.

Employee Awareness Program. An employee training program shall include information on bighorn sheep habits and habitat needs, as well as their protected status. This employee awareness program will increase acceptance and knowledge of bighorn sheep.

Firearms. Only authorized individuals will be permitted to possess firearms on the landfill site to preclude the possibility of poaching or harassment of bighorn sheep.

Dogs. Dogs will not be permitted on the landfill site unless they are confined or restrained. This precludes harassment or killing of sheep by dogs.

Significance After Mitigation

The impacts will be reduced to below a level of significance by incorporating the mitigation measures listed above.

b. Reduced Landfill Operations Alternative

Impacts

Bighorn sheep habitat will be impacted from landfill operation. The amount of habitat lost with this configuration of the landfill would be reduced but would still represent a significant loss of bighorn sheep habitat due to the loss of water sources. The permanent water source in the East Pit will not be lost to the landfill, but the two water tanks will still be lost.

Mitigation

Mitigation measures would be the same as listed above for the proposed action.

Significance After Mitigation

Mitigation measures will reduce significant impacts to bighorn sheep to a level below significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

No changes in impacts to bighorn sheep are expected to occur because the elimination of the road from the project is the only change and sheep do not currently use the habitat along the Eagle Mountain Road corridor, and no known movement corridors exist across the road.

Mitigation

Mitigation measures will remain the same as those for the proposed action.

Significance After Mitigation

All impacts to bighorn sheep will be reduced to a level below significance.

d. No Action Alternative

Impacts

No significant impacts will occur to bighorn sheep.

Mitigation

No mitigation will be necessary.

Significance After Mitigation

No significant impacts will occur under this alternative.

3. Desert Pupfish

Assumption and Assessment Guidelines. Impacts to desert pupfish were determined to be significant or insignificant based upon the sensitivity of the species at the tributary of Salt Creek and the legal requirements governing mitigation of impacts such as the federal and state endangered species acts. Impacts to pupfish were considered *take* under the federal Endangered Species Act, which is defined as actions which ". . . harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 U.S.C. Section 1538 [1973]). All habitat supporting pupfish or considered pupfish habitat by CDFG was considered significant.

Basic assessment guidelines used to determine impacts to desert pupfish are the results of field surveys, agency reports, and personal communication with agency staff.

a. Proposed Action

Impacts

A summary of impacts and mitigation measures is listed in Table 40. Pupfish were observed in a Salt Creek tributary in 1982 (Nicol, pers. comm. 1989) a time near the end of several decades of train operations. Although earlier surveys were not intended to specifically assess the effect of the rail operations on the pupfish habitat, it is apparent that the pupfish population continued within the streambed immediately under the railroad trestle for some time. The frequency and length of trains anticipated with the proposed landfill are approximately the same as in the former mining operation. Therefore, no significant changes are anticipated in the overall quality of the habitat.

Because trash will be fully contained in closed containers, no trash will escape during train travel and no impacts are expected to occur to pupfish or their habitat from solid waste discharges. However, direct and uncontrollable impacts may occur to pupfish if there is an accident along the trestle during rail operations. Furthermore, it should be expected that sometime during the 100-year life of the project maintenance or reconstruction of the trestle will become necessary. Major construction activities in the immediate area of pupfish habitat could have a significant impact.

Mitigation

Mitigation for potential impacts to pupfish habitat include monitoring the pupfish population in the Salt Creek system, development of a mitigation program for impacts caused by maintenance activities, and monitoring by a biologist of emergency cleanup operations. These mitigation measures will be incorporated into Section 7 consultation and DOI Biological Opinion and CDFG 2081 MOU for implementation.

Monitoring. Annual surveys of the pupfish populations and habitat will continue along Salt Creek and its tributary under the train trestle. Although no significant changes are expected, in the event there are any effects on the habitat which are caused by the train operations, these will be reported to MRC and corrective actions will be developed in consultation with USFWS and CDFG.

Maintenance Activity Mitigation. If maintenance of the trestle or railroad in the Salt Creek tributary must occur, mitigation measures will be incorporated into the project plans to reduce potential impacts to desert pupfish. Plans for construction or major maintenance will be reviewed by a biologist and will include designs and specifications that will avoid impacts to desert pupfish. Storage and staging areas will be placed in locations which will not affect the habitat, and measures to avoid any discharge of pollutants will be incorporated.

Emergency Response. In the event any rail accidents occur in the vicinity of desert pupfish habitat, a biologist will be included as a response and cleanup team member. The cleanup operations will be monitored by the biologist so that additional adverse impacts are not incurred by the cleanup operation. Measures to restore the pupfish habitat in Salt Creek and its tributary in the event of an accident shall be incorporated as part of the response. If restocking of pupfish is required in the aftermath of an accident, the nearest suitable genetic strain of pupfish will be the source of the transplantation.

Significance After Mitigation

The impacts to desert pupfish described above will be reduced to below a level of significance by incorporating the mitigation measures listed above.

b. Reduced Landfill Operations Alternative

Impacts

Impacts to desert pupfish resulting from this alternative would be the same as the proposed action.

Mitigation

Mitigation measures for this alternative would be the same as for the proposed action.

Significance After Mitigation

The impacts to desert pupfish resulting from this alternative will be reduced to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

Impacts to desert pupfish resulting from this alternative would be the same as the proposed action.

Mitigation

Mitigation measures for this alternative would be the same as for the proposed action.

Significance After Mitigation

The impacts to desert pupfish resulting from this alternative will be reduced to below a level of significance.

d. No Project Alternative

Impacts

No significant impacts will occur to desert pupfish as a result of this alternative.

Mitigation

No mitigation measures will be required.

Significance After Mitigation

No significant impacts to desert pupfish will occur with this alternative.

4. Other Wildlife Species of Special Concern

Assumptions and Assessment Guidelines. Impacts to the remaining sensitive wildlife species were determined to be significant or insignificant based upon the sensitivity of the species, the extent of the impact, and the legal requirements governing mitigation of impacts such as the federal and state Endangered Species Acts and the California Fish and Game Code. Habitats supporting these species were considered significant or insignificant in a similar manner.

Impacts to other sensitive wildlife will occur throughout the project site and the basic assumptions include losses of individuals and habitats, especially losses to foraging areas, resting sites, and sites for rearing young. Consideration was given to migratory patterns for many of the bird species.

a. Proposed Action

Impacts

Several sensitive species which occur or potentially could occur at the landfill site or along the railway may be impacted by the proposed landfill activity. A summary of impacts to these species and mitigation measures, if needed, are listed in Table 40. The following discussion is directed towards those species that could be significantly impacted.

The implementation of the project may impact black-tailed gnatcatchers and LeConte's thrasher by the removal of nests, potential nesting sites, and foraging habitat. Approximately 994 acres of habitat on slopes and in ravines, drainages, and washes found both in the mountainous areas and in the flatter portions of the landfill site will be removed by the proposed action. Loss of this habitat is not considered significant, as there is an abundance of such habitat in the Eagle Mountains and in the nearby valley bottoms and bajadas. Approximately 644 acres of this creosote bush scrub habitat, including washes, is set aside on the landfill site as permanent open space (see Figure 89).

A small potential exists for a landfill-caused increase in the regional raven population to impact the Eagle Mountain scrub jay. Ravens may prey upon the eggs and young of scrub jays (Hays, pers. comm. 1991). Impacts to the jay from increased raven depredation would be considered significant.

Significant impacts could occur to the California leaf-nosed bat at the landfill site. The species roosts in the large adit in the area that will be filled in approximately 35 years. Impacts could also occur to this species before the adit is filled in 35 years if the adit is disturbed or closed off. The loss of the water source at the bottom of the East Pit is not considered a significant impact to this species since the Eagle Mountain townsite reservoir will still be available for water.

Implementation of the railroad may affect badgers if their burrows are destroyed during construction maintenance. The location of the one badger burrow found is shown on Figure 57c. No burrowing owls or their burrows were observed during the survey, but appropriate habitat exists throughout the railroad corridor and flat portions of the Eagle Mountain landfill site. Impacts to burrows may occur in the future. Burrowing owls are especially vulnerable to burrow destruction because they use their burrows for both nests and roosting sites. Although burrows of these species may be temporarily impacted by rail line repair and maintenance activity, these species are mobile enough, and alternate appropriate habitat exists in abundance in the immediate vicinity of the rail corridor, that impacts are not expected to be significant. All raptor nests are protected by the Migratory Bird Treaty Act.

Mitigation

Mitigation for impacts to other sensitive wildlife resources will include preservation of habitat on site and dedication of off-site acreage for open space (i.e., desert tortoise habitat, which will also likely support some sensitive bird species). Mitigation measures for other sensitive wildlife species will be incorporated into conditions on the County of Riverside Specific Plan.

On-site Open Space. Approximately 644 acres within the project boundaries will be retained as natural open space. This open space is currently habitat for the black-tailed gnatcatcher and the LeConte's thrasher.

Off-site Open Space. Approximately 375 acres will be preserved off-site to provide compensation for desert tortoise habitat losses within the project area. This area has yet to be selected by the BLM, but is likely to also support some or all of the other wildlife species of concern, in particular the black-tailed gnatcatcher and the LeConte's thrasher.

Bat Roost Monitoring and Adit Extension. The California leaf-nosed bat population at the mine will be monitored during landfill operations. A chimney constructed of large-diameter concrete sewer pipes will be installed over the mine adit to permit the ingress and egress of the bats. This chimney will be extended as the level of refuse increases. This addition will extend above the elevation of the final landfill contour. Because the bats roost deep within the mine tunnel and are active at night, when landfill operations have ceased, they should continue to use the adit, via the chimney extension, after operations begin.

Raven Control Program. The proposed raven monitoring/control program discussed under desert tortoise mitigation would reduce any potential impacts to Eagle Mountain scrub jays from the Eagle Mountain landfill project to a level below significance.

Significance After Mitigation

The impacts to other sensitive wildlife species will be reduced to a level below significance by incorporating the mitigation measures listed above.

b. Reduced Landfill Operations Alternative

Impacts

Impacts to American badger, burrowing owl, and California leaf-nosed bat will be the same as those with the proposed action. The reduced landfill operations alternative will greatly reduce total habitat loss for the black-tailed gnatcatcher and LeConte's thrasher.

Mitigation

Mitigation measures will remain the same as for the proposed action.

Significance After Mitigation

Mitigation measures will reduce impacts to other sensitive wildlife species resulting from this alternative to a level below significance.

c. Proposed Action with Rail Access Only Alternative

Impacts

Impacts to other sensitive wildlife species resulting from this alternative are the same as those under the proposed action.

Mitigation

Mitigation measures will remain as described for the proposed action.

Significance After Mitigation

Impacts to other sensitive wildlife species resulting from this alternative will be below a level of significance.

d. No Action Alternative

Impacts

No significant impacts will occur to any sensitive wildlife species.

Mitigation

No mitigation measures will be required.

Significance After Mitigation

No significant impacts will occur to any sensitive wildlife species under this alternative.

5. Sensitive Plant Species

Assumptions and Assessment Guidelines. Impacts to sensitive plants were determined to be significant or insignificant based upon the sensitivity of the species and the legal requirements governing mitigation of impacts such as the federal and state endangered species acts, and the California Native Plant Protection Act. Major impacts to any federal listed, federal candidate, or state-listed plant species were considered significant, and any major impacts to habitats supporting these species were considered significant. Impacts were considered significant or insignificant for other plant species of concern based upon the sensitivity of the species observed at the project site and the extent of the impact. The evaluation of these impacts included the amount of losses to individuals, their population(s), and their habitat; the level of disturbance to individuals and populations; and any reduction in habitat quality. A summary of impacts to sensitive plants and mitigation measures for the project is listed in Table 40.

a. Proposed Action

Impacts

Two concentrations of Alverson's foxtail cactus occur within the existing Eagle Mountain Mine area. One concentration occurs in the southern portion of the storage area (165 acres) and one concentration occurs within the southwestern perimeter of the proposed landfill footprint (125 acres). The latter of these two (125 acres) would be removed by the project. An additional 33.3 acres of Alverson's foxtail cactus habitat will be impacted by the extension of Eagle Mountain Road and the railroad spur to the landfill site. Impacts to Alverson's foxtail cactus are considered significant.

A portion of the population of California barrel cactus would be impacted by the proposed landfill. However, the large population size (number of individuals) and area covered by this species on the undisturbed slopes surrounding the existing mine will result in a large proportion of the population being preserved in dedicated open space. Impacts to this species are not anticipated to reach a level of significance requiring mitigation, although they would contribute to the cumulative loss of the species.

Major impacts to Orocopia sage within the Eagle Mountain rail line right-of-way are not expected to occur since the rehabilitation and maintenance activities along the rail line will not involve large disturbances. The potential for the loss of a few individuals of this species growing immediately adjacent to the railroad tracks and maintenance road can most likely be avoided. It is anticipated that unavoidable impacts to this species would not reach a level of significance requiring mitigation, especially if potential impacts are minimized by marking the areas containing populations of Orocopia sage in the field and avoidance of the species is implemented.

Other sensitive annual and perennial plant species may occur within the proposed Eagle Mountain landfill site; however, based on current survey results and historical distributional data for these species, large populations of any of these plants are not expected to occur in the existing Eagle Mountain Mine area, within the railway corridor, or within the Eagle Mountain Road corridor. Therefore, no significant impacts are anticipated to these species.

Mitigation

Impacts to Alverson's foxtail cactus and its habitat shall be mitigated by initiating a transplant program that will be conducted on suitable areas within the project boundary. This program shall be funded by the project proponent as a sponsored research program that will provide needed information on the rehabilitation of desert habitat using cactus transplants. The transplant program will involve the following steps:

1) Transplant trials shall be conducted on the following areas within the proposed landfill site to determine which areas are most suitable for the establishment of Alverson's foxtail cactus:

    a) Areas of Eagle Creek south of the mining road in locations where minor disturbance has occurred. This site is a portion of Special Planning Area 6 of the Eagle Mountain Landfill Specific Plan.

    b) Locations in lowlands adjacent to drainages on the southwest portion of Special Planning Area 6 where minor disturbances have occurred.

    c) Locations near the foothills of the Eagle Mountains on the upper bajada area on the northeast portion of Special Planning Area 6.

    d) Locations within Special Planning Area 4 where minor disturbances have occurred.

2) Prior to any transplants being taken from their original habitat, the natural density of the population (number of plants per acre) shall be estimated. Estimates of density can be made by counting the number of Alverson's foxtail cactus observed in quadrats along transects across the population. The resulting density figure will be used in the second stage of the transplant program.

3) The transplant trials shall utilize 10-15 percent of the Alverson's foxtail cactus population to be impacted by the proposed landfill in Eagle Creek to the north of the mining road. A proportion of the salvaged individuals will be transplanted to each trial habitat area.

4) The transplanted Alverson's foxtail cactus used for the initial trials shall be monitored once a month for one growing season (including a summer). After the trial period is complete,

the location(s) having the greatest survivorship will become the site(s) for the completion of the transplant program.

5) Transplanting of Alverson's foxtail cactus, either for the initial planting trials or for the main transplanting effort, shall occur at the most appropriate time of year (late winter/early spring) to take advantage of the rainy season and to increase survivorship of the transplanted material.

6) Sites selected for the main transplant effort shall be planted with the remaining individuals of Alverson's foxtail cactus salvaged from the impact areas of the proposed landfill project at a density similar to that estimated for the natural population (see *2)* above).

7) The final mitigation areas shall be monitored once a month for one growing season (including a summer) to measure survivorship of the cacti and determine the degree of success of the transplant program.

8) A final report summarizing the results of the transplant program shall be prepared by the project proponent and submitted to BLM, CDFG, and USFWS.

Significance After Mitigation

The impacts to sensitive plant species described above will be reduced to a level below significance by the implementation of measures listed above.

b. Reduced Landfill Operations Alternative

Impacts

The major concentrations of Alverson's foxtail cactus will remain impacted by this alternative.

Mitigation

Mitigation measures to reduce impacts to Alverson's foxtail cactus habitat are the same under this alternative as under the proposed action.

Significance After Mitigation

The impacts to Alverson's foxtail cactus will be reduced to a level below significance by the implementation of measures listed above.

c. Proposed Action with Rail Access Only Alternative

Impacts

Some cumulative losses to individuals of Alverson's foxtail cactus will be reduced if improvements and construction will not be needed along Eagle Mountain Road. Impacts at the proposed landfill site and along the railroad spur will remain the same as the proposed action.

Mitigation

Mitigation measures will remain as described above for the proposed action.

Significance After Mitigation

Impacts to Alverson's foxtail cactus will be reduced to a level below significance by the implementation of measures listed under the proposed action.

d. No Action Alternative

Impacts

No significant impacts will occur to any sensitive plant species.

Mitigation

No mitigation measures will be required.

Significance After Mitigation

No significant impacts will occur to any sensitive plant species under this alternative.

6. Major Washes and Drainages

Assumption and Assessment Guidelines. The protection of washes and drainages is under the jurisdictional requirements of the U.S. Army Corps of Engineers (USACE) (Section 404 of the Clean Water Act) and the California Department of Fish and Game (Sections 1600-1603 of the California Fish and Game Code). Each of these agencies requires permits or agreements to be issued before any impacts can occur to these resources or adjacent wetlands. If the total fill deposited into defined "waters of the U.S." or adjacent wetlands from the entire proposed landfill project exceeds one acre, then the USACE must be notified and the project reviewed to determine whether an individual 404 permit is required or the project qualifies under a nationwide permit. All alterations to major drainages require that an agreement be entered into between the project proponent and CDFG regarding the alteration of the streambed. The resulting Streambed Alteration Agreement will identify compensation measures to ensure minimal impacts to fish and wildlife resources.

a. Proposed Action

Impacts

No significant impacts to adjacent wetlands are anticipated to occur from this project. The only potential impacts to wetlands which may occur during future construction/maintenance activities would be associated with the trestle in the desert pupfish habitat in the tributary to Salt Creek. However, major washes and drainages will be filled within the proposed landfill site, well exceeding the one-acre threshold. Additional fill will be deposited in washes and drainages when improvements to Eagle Mountain Road are completed. The combined fill to "waters of the U.S." by the proposed action may require an individual 404 permit from the USACE. Alterations to these same washes and drainages will require the issuance of a Streambed Alteration Agreement by CDFG.

Mitigation

Based on current maintenance, construction, and operation plans, no disturbance to any of the adjacent wetland habitat would occur; therefore, no specific wetland mitigation is required. If any future construction/maintenance activities do involve any impacts to wetlands (i.e., Salt Creek), they will require supplemental permits or agreements be issued by the USACE and CDFG so that the wetlands are replaced in a manner that would satisfy the "no net loss" of wetlands policy of these agencies. The specific plan for the project shall incorporate this requirement.

Specific compensation measures to offset the filling and alteration of significant washes and drainages by the proposed action will be outlined in the individual 404 permit and Streambed Alteration Agreement which may be required for the project. Minimal compensation shall require that drainage flows continue in the natural washes by minimizing the deposition of fill and providing a means for enhancing drainage (e.g., installation of adequate culverts). Measures shall be taken to minimize the sedimentation of downstream portions of the wash by implementing standard erosion-preventing practices.

Significance After Mitigation

The impacts described above will be reduced to a level below significance by incorporating the mitigation measures listed and by meeting compensation measures identified in specific project permits and agreements.

b. Reduced Landfill Operations Alternative

Impacts

Impacts to wetlands, washes, or drainages resulting from the reduced landfill operations alternative will be similar to the proposed action, though fewer washes would be impacted.

Mitigation

Mitigation measures will remain the same as described above for the proposed action.

Significance After Mitigation

The impacts described above will be reduced to a level below significance by incorporating the mitigation measures listed in the proposed action.

c. Proposed Action with Rail Access Only Alternative

Impacts

Eighteen washes and drainages will no longer be impacted by improvements to and construction of Eagle Mountain Road. Major washes and drainages will still be significantly impacted at the proposed landfill site.

Mitigation

Mitigation measures will remain as described above for the proposed action.

Significance After Mitigation

The impacts described above will be reduced to a level below significance by incorporating the mitigation measures listed for the proposed action.

d. No Action Alternative

Impacts

No significant impacts will occur to any wetland habitat or to any washes and drainages under the No Action alternative.

Mitigation

No mitigation measures will be required.

Significance After Mitigation

No significant impacts will occur to any wetland habitat or to any washes and drainages.

H. Growth Inducement and Socioeconomics

Since the townsite of Eagle Mountain is not included in the landfill project area or its specific plan, growth issues such as traffic and public services and design guidelines will be discussed more fully in the EIR associated with the townsite specific plan area. Additionally, the granting of the Eagle Mountain Road and railroad rights-of-way and the BLM/Kaiser Steel Resources, Inc., land exchange would not directly result in any growth inducement or socioeconomic impacts. Only the landfill operations portion of the proposed action has the potential for growth inducement and socioeconomic impacts. These are discussed below.

1. Growth Inducement

Assumptions and Assessment Guidelines. As discussed in the Utilities and Services section of this draft EIS/EIR, all of the major public services and utilities were developed in the town of Eagle Mountain by Kaiser Steel Resources to support a town of 3,700 persons. Since the mine is now inactive, most of the single-family residences are unoccupied, and the supporting commercial and institutional facilities are no longer in operation. The project would be considered to have a significant growth-inducing effect if the employment it created would induce substantial growth or concentration of population and a need for substantial increases in infrastructure requirements.

a. Proposed Action

Impacts

Local Growth Inducement. At its maximum buildout, the landfill project is expected to provide approximately 163 jobs. A breakdown of the personnel requirements for the landfill and rail operation is shown in Table 41. It is likely that some of the jobs would be filled by people currently living in the area and that previous Kaiser Steel employees may be available to work at the landfill. MRC would give priority to qualified local residents. However, persons from outside the area would also relocate to work at the landfill.

With an average household size of 3.6 persons (SCAG 1980) and assuming each job would represent a household, the 163 jobs would translate to a maximum population increase of approximately 580 persons. The SCAG 1980 census information is considered more representative of an actual maximum population at Eagle Mountain since the 1989 census update by Riverside County reflects an average household size based primarily on the retirement community of Lake Tamarisk. Again, not all of the population would move into the community, since some of the future employees would be people already living in the area. It is also possible that some of the rail workers would live in other desert areas. Additional persons could also be expected to move into the area to renovate/expand the supporting commercial

TABLE 41
PROJECTED STAFFING ASSUMPTIONS
AT MAXIMUM CAPACITY

Staffing	Number at 20,000 TPD	Number at 16,000 TPD
TRANSPORTATION		
Container manager	1	1
Container maintenance	4	4
Maintenance foreman	4	4
Track maintenance	6	6
Operations foreman	2	2
Train engineer	2	2
Train conductor	2	2
Total transportation staff	21	21
LANDFILL		
Manager	1	1
Assistant manager	2	2
Foreman	3	3
Secretary/clerk	4	3
Master mechanic	1	1
Mechanic	7	6
Welder	3	3
Laborers/clean-up crew/general maintenance	7	6
Container loaders	8	7
Grader operators	4	4
Scraper operator	7	6
Transport tractor operator	46	39
Compactor operator	12	11
Dozer operator	13	12
Water wagon operator	3	3
Parts handler	1	1
Truck drivers	5	4
Hydrologist/environmentalist	2	2
Safety engineer	1	1
Surveyor	1	1
Surveyor assistant	2	2
Electrician	2	2
Designer/draftsperson	3	3
Scale operator	4	3
Total landfill staff	142	126
TOTAL STAFF	163	147

facilities for the larger population, primarily at Eagle Mountain. Although not related to the project, the approved expansion of the RTCF would require 65 additional employees, some of which would likely live in the area.

Housing for the future employees is available at Eagle Mountain. Approximately 416 vacant single-family housing units exist at Eagle Mountain, and the units would be rented to MRC employees by Kaiser Steel Resources. The units would need to be renovated prior to occupancy by the employees since the homes have been vacant since 1982. It is possible that some of the employees would locate at Lake Tamarisk, Blythe, or Indio. There are a few existing residences available at Lake Tamarisk, and Kaiser Steel Resources owns an additional 150 lots which could be sold to future employees of the landfill. However, given the immediate proximity of Eagle Mountain to the workplace landfill operation and the schools for the area, it is anticipated that the majority of the landfill workers would live at Eagle Mountain. As noted above, there are no available housing units at Desert Center.

Although the size of the community at Eagle Mountain and to a lesser degree Desert Center and Lake Tamarisk would be much less than that associated with the previous mining operations, the population would be large enough to attract and justify some commercial uses to serve the residents. The increased population, employment, and income resulting from the operation of the proposed facilities would be considered a socioeconomic benefit to the surrounding communities, and the long-term operation of the landfill would lend stability to communities and sustain community services. However, these impacts are not considered significant because the services required by the increased population are generally already available (see Section IV.K. of this draft EIS/EIR) and an increased population of under 1,000 persons to the area is not substantial.

Regional Growth Inducement. Growth is generally attributed to either one of two scenarios: (1) extraregional economic and employment forces rather than the provision of infrastructure or (2) the provision of new infrastructure which may influence the amount, distribution, and nature of development. The proposed project would not provide for substantial regional employment. A brief discussion of potential secondary material industries resulting from development of the proposed action can be found in the Cumulative Projects section of this draft EIS/EIR.

Solid waste will continue to be generated in the southern California region whether this project is approved or not. Growth will be neither discouraged or encouraged in the region by the denial or approval of this project. The approval of the proposed project is therefore not considered a significant regional growth-inducing impact.

Mitigation

Mitigation measures would not be required.

Significance After Mitigation

The growth-inducing effects of the increased population at Eagle Mountain from the proposed action are considered beneficial and not significant. The regional growth-inducing impact is also considered not significant.

b. Reduced Landfill Operations Alternative

Impact

A reduction in the landfill operations would reduce the number of employees needed to operate the landfill by 10 percent (16 employees). Table 41 shows this reduction in employees. Thus, the impacts from the in-migration of persons to Eagle Mountain and the other communities would be similar with those associated with the proposed action.

Mitigation

Since the growth-inducing effects of this alternative are considered not significant, no mitigation is required.

Significance After Mitigation

The growth-inducing impacts of this alternative are considered not significant.

c. Proposed Action with Rail Access Only Alternative

Impact

Since this alternative would likely reduce the number of employees necessary to operate the landfill in the same way the reduced operations alternative would, the impacts would be similar to the reduced operations alternative.

Mitigation

No mitigation is required.

Significance After Mitigation

The growth-inducing impacts of this alternative are considered not significant.

d. No Action Alternative

Impact

The No Action alternative would not attract persons to Eagle Mountain to work at the site. While the number of persons in Eagle Mountain would increase due to the expansion of the RTCF, the long-term reestablishment of the community due to a larger population would not occur.

Mitigation

No mitigation is required.

Significance After Mitigation

No growth-inducing impacts would occur due to this alternative.

2. Socioeconomic Effects

Assumptions and Assessment Guidelines. See the discussion of assumptions and assessment guidelines above.

a. Proposed Action

Impacts

Local Economy. The increased population, employment, and income resulting from both the construction and long-term operation of the proposed landfill facility would be considered an economic benefit to the Desert Center communities. The landfill would increase employment opportunities for the local population and allow for long-term economic stability in the affected communities. The additional population would help sustain and likely increase the existing business income levels (e.g., commercial services at Desert Center and Lake Tamarisk). At Eagle Mountain and to a lesser degree at Lake Tamarisk and Desert Center, the need for new local support commercial/business opportunities would also be created, thereby expanding the range of goods and services available in area. As discussed above, the 163 landfill-related jobs would attract commercial support interests to Eagle Mountain. Although not related to the project, the additional 65 jobs created by the RTCF would be further incentive for commercial reestablishment in Eagle Mountain. Likewise, the increased population could also have a positive influence on real estate and property values in the surrounding area.

A related positive economic impact concerns the medical and pension fund for Kaiser retirees (both salary and hourly employees). There are approximately 7,000 Kaiser Steel retirees, the majority of whom live in the local area, other portions of Riverside County, and San Bernardino

County (Fawcett, Kaiser Steel Resources, 1/15/90). The bankruptcy proceedings for Kaiser Steel resulted in the major creditors being given stock in the newly reorganized company. At the present time, the Volunteer Employee Benefit Association (VEBA), a medical benefit association of retirees, and the pension trust own a majority of the stock in the reorganized company. Direct revenues would be realized by Kaiser from the existing 100-year lease of the land to MRC with rent set at a percentage of the "tipping" fee for wastes disposed of at the site. The proposed landfill project was a major consideration by the creditors and the courts in allowing the reorganization of Kaiser Steel Resources (Fawcett, Kaiser Steel Resources, 1/15/90). The ability of Kaiser Steel Resources to fund these medical and pension funds is also directly related to the value of the stock. As the value of Kaiser stock increases, additional income will be available for redistribution to the stockholders in the form of medical and pension benefits. Thus, to a large degree, the success of the proposed action and increase in stock value dictates the ability of Kaiser Steel Resources to fund the commitments.

Economic benefits would also accrue to the County of Riverside. Additional tax revenue to the County could result from possible property value increases on this project property and in the area and from any new commercial uses. Another revenue source to the County is based on the MOU between MRC and the County which mandates that MRC pay the County based on the solid waste actually disposed of at the landfill. The MOU payment schedule varies between four and six dollars per ton depending on the number of tons deposited in any calendar year. With the landfill operating at full capacity, the revenue to the County would be approximately $30 million per year (1990 dollars). In the first year of operation, the revenue would be close to $3 million dollars. A portion of this money would be allocated to supervisorial districts with an anticipated major portion incurring to the benefit of the 4th Supervisorial District and to the impacted Desert Center area (County Services Area 51) in eastern Riverside County within this district, which includes the Desert Center communities. CSA 51 could anticipate as much as a tenfold increase in its yearly revenues as a result of the proposed action (see Table 13). This would more than offset any expenditures resulting from the project. The MOU also stipulates that MRC pay the County of Riverside $444,000 toward the cost and operation of County Services Area 51 during the project permitting phase provided that certain other requirements established in the MOU are met.

Regional Economy. On a regional level, the primary economic impact on residents would be an increase in the costs associated with solid waste disposal. The current average monthly collection cost to single-family homeowners in the San Gabriel Valley is $9.35. With waste-by-rail the monthly cost could rise to $12.50 to $14.50, or an increase of 33 percent to 55 percent. This estimate assumes that each household generates two tons of refuse per year.

Tipping fees at major landfills in the greater Los Angeles area averaged approximately $10 in 1987 and $18.50 in 1990. These fees are expected to increase over the next five years because of declining landfill capacities. Also, these fees do not include the costs of screening for hazardous materials, removal of recyclables, loading, or transportation to the disposal site.

The anticipated tipping fee at the proposed Eagle Mountain project, which includes such recycling and transportation costs, is approximately $45/ton during the early years of the project. The cost components associated with this tipping fee include operation of the landfill, rail haul at the container handling yard at Eagle Mountain, overhead and profit by MRC, rail transport at the loading stations, and container handling at the unloading stations.

By the time the proposed Eagle Mountain project would begin operation, tipping fees at landfills in the greater Los Angeles area will have increased such that any cost increase associated with the project would not be considered a significant regional economic impact.

Mitigation

The effect of the project on the local economy represents a positive impact; therefore, mitigation is not necessary. Regional economic impacts are not considered significant and would not require mitigation.

Significance After Mitigation

The local economic effects of the project at Eagle Mountain are beneficial and therefore are not considered significant. Because of the anticipated increase of tipping fees throughout the region, the regional economic effects of the project are not considered significant.

b. Reduced Landfill Operations Alternative

Impact

A reduction in the landfill operations would reduce the ultimate capacity of the site by approximately 20 percent. Such a reduction would not affect the economic benefits to the local area associated with the redevelopment of Eagle Mountain. However, the ultimate cash flow to the County of Riverside would be reduced as the total tonnage would not be as great. The actual tonnage reduction could amount up to $4,000,000 a year in County tipping fees. Regionally, a reduction in the landfill operations would not likely alter the costs of the project.

Mitigation

No mitigation is required for the local economy since this alternative represents a positive impact. Regionally, no mitigation is required.

Significance After Mitigation

The local economic effects of the project at Eagle Mountain are beneficial and therefore are not considered significant. The economic effects of this alternative on the region would also not be considered significant.

c. Proposed Action with Rail Access Only Alternative

Impact

Since this alternative would reduce the number of employees necessary to operate the landfill by only 15 percent, the economic impacts on the surrounding communities would be similar to the proposed action. However, this alternative would reduce the daily capacity to 16,000 tons per day. Such a reduction would thereby reduce the maximum annual cash flow to the County by about $4,000,000. On a regional basis, impacts for this alternative would be similar to those of the proposed action.

Mitigation

No mitigation is required.

Significance After Mitigation

The local and regional economic effects of the project at Eagle Mountain are discussed above. They are not considered significant.

d. No Action Alternative

Impact

The No Action alternative would not attract persons to Eagle Mountain to work at the site and would not stimulate the local economy. Economic benefits to the County would also not occur. On the regional level, the No Action alternative would avoid the cost increase in the near future for solid waste disposal which would be associated with the proposed action. Without the proposed landfill, the Southland would have inadequate landfill space for solid waste generated in the region, particularly Los Angeles. This could result in socioeconomic impacts. This scenario would be similar if the reverter clause was implemented and the land was returned to BLM ownership.

Mitigation

Since no project impacts would occur, no mitigation is necessary.

Significance After Mitigation

No impacts would occur to the local economy or the Southland region with the No Action alternative.

I. Geology and Mineral Resources

1. Soil and Geologic Conditions

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if they prevent the siting of a Class III landfill as defined in the California Code of Regulations, Title 23, Division 3, Chapter 15 (1984). This would include the presence of geologic conditions such as compressible soils and liquefaction which would contribute to the destruction or severe damage to structures during a geologic event and which could endanger the lives of landfill personnel or of other persons in the project area.

a. Proposed Action

Impact

Based on site reconnaissance and review of studies performed by SCS Engineers, dense, clayey soils exist within the fine tailing storage lagoons and also occur in those areas of the project underlain by alluvial material. It is not presently known whether these soils are expansive. If expansive soils are found to be present within those areas proposed for construction of facilities, possible mitigation measures such as selective or remedial grading techniques would be addressed at that time.

Also, based on site reconnaissance and a review of stereo aerial photographs, natural slopes appear to be stable.

Currently, approximately 50 to 70 percent of the benches constructed in the bedrock of the East Pit have failed or are unstable. Several south- and north-facing pit walls and benches have experienced slope instability where debris has collected on downslope benches. In one such area, landsliding has removed approximately three benches, creating a nearly continuous backslope for a vertical distance of approximately 180 feet (SCS Engineers 1990).

Most of the instability appears to be related to wedge failures in highly fractured bedrock. In some areas, it appears that blasting practices and ore removal procedures have contributed to the instability of the pit or the disappearance of entire benches for up to distances of 200 feet.

Additionally, some surficial instability is present on the west-facing cut slopes excavated in the alluvial area of the East Pit. In this area, slope instability appears to be erosional and related to concentrated surface water drainage. Although no rotational or translational type failures were noted, several gullies and washouts currently exist.

The landfill of refuse is planned for portions of the waste rock dumps to the northeast of the East Pit area. Materials placed in these waste rock dumps were end-dumped and loose-graded into their current location. Compaction efforts in these areas are unknown at present. Additionally, the top three to five feet of the alluvial material in the eastern project area are porous and appear to be relatively loose. Without mitigation, the potential for settlement in the waste rock dumps and the alluvium is considered to be moderate to high. There may be potential for settlement that could affect the clay liner placed between these materials and the landfill refuse (SCS Engineers 1990).

Presently, collapse potential or hydroconsolidation in the vicinity of the project area is unknown. However, site reconnaissance and literature review indicate that subsurface conditions and soils subject to collapse potential or hydroconsolidation do not appear to be present within the project area.

Site reconnaissance indicates that large boulders (up to about 10 feet in diameter) are present in waste dump material within the northern portion of the project area. Handling and burial of this material may require special treatment if development is anticipated to include the material for refuse cover. Currently, the project does not propose to use such large material.

The issuance of rights-of-way over Eagle Mountain Road, its extension, and the Eagle Mountain rail line would not have geological impacts. The land exchange, made up of selected and offered lands, would not have any geological impacts.

Mitigation

Mitigation measures for on-site unfavorable soil conditions include:

1) Expansive Soils—Identify expansive soils in alluvial material within the landfill footprint. Regrade, as necessary.

2) Slope Stability—Determine safe slope angles and maintain slopes within this range. Identify need to flatten slopes or construct fill buttresses. Place liner against safe slope angles. Keep loose rock cleaned off benches on north- and south-facing cut slopes in areas immediately above areas of active landfilling.

3) Preparation of Ground for Landfilling—To reduce adverse impacts associated with settlement of alluvial materials in the East Pit area, excavate and/or recompact unsuitable soils prior to liner construction.

Significance After Mitigation

Potentially expansive soils and slope instability could create significantly adverse conditions in the project site. The impacts would be reduced to levels below significance by the mitigation measures listed above.

b. Reduced Landfill Operations Alternative

Impact

This alternative would result in the same type of geological impacts discussed above for the proposed action.

Mitigation

The same mitigation measures indicated for the proposed action would be necessary.

Significance After Mitigation

Significant geological impacts would be reduced to insignificance by the recommended mitigation measures.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would result in the same type of impacts identified above for the proposed action.

Mitigation

The same mitigation measures identified for the proposed action would apply.

Significance After Mitigation

Significant geological impacts would be mitigated to levels of insignificance by the recommended mitigation measures.

d. No Action Alternative

Impact

If development does not occur, no on-site structures will be subject to impacts related to geology, soils, or seismicity.

Mitigation

No mitigation measures will be necessary.

Significance After Mitigation

There would be no potentially significant impacts to on-site structures.

2. Seismic Hazards

Assumptions and Assessment Guidelines. For the following environmental analysis, impacts will be considered significant if they prevent the siting of a Class III landfill as defined in CCR, Title 23, Division 3, Chapter 15 (1984). This would include the presence of an active fault on-site (so that one or more project components could be destroyed or severely damaged as a direct consequence of a geologic event) and the presence of other geologic conditions which would directly or indirectly endanger the lives of landfill personnel or of other persons in the project area (for example, if chemicals were to be released into the environment in case of a geologic event). In addition, Chapter 15 regulations require that Class III landfills be designed to withstand the maximum probable earthquake without damage to the foundation or to structures which control leachate surface drainage, erosion, or gas.

a. Proposed Action

Impact

Although a number of generally northwest-trending faults have been reported to extend through the project area, none of the faults noted in the literature or mapped by Kaiser Steel personnel are known to be active. Recent site mapping has delineated the surface trace of a fault zone crossing the central portion of the East Pit with a northwesterly trend (see Figure 63). This fault cuts through bedrock in the pit but is overlain by Quaternary alluvium in the south wall of the pit. This relationship indicates that the latest fault movement predated deposition of the alluvium and suggests that this fault is pre-Quaternary in age and thus not active or potentially active. Based on the data in this section, it appears that the potential for surface faulting at the proposed project site is low.

Several active fault zones are within 62 miles of the project area. The maximum characteristic (equivalent to maximum probable) earthquake magnitudes for these faults are shown on Table 42 (Wesnousky 1986). These magnitudes range from 6.2 to 7.5. Severe ground shaking could occur at the site during a seismic event of this magnitude. Wesnousky indicates a peak horizontal ground acceleration of 0.1 *g* in the area of the proposed project.

Secondary seismic hazards, such as those associated with severe ground shaking during an earthquake, include ground rupture, liquefaction, seiches or tsunamis, flooding (dam or levee failure), landsliding, rockfalls, and seismically induced settlement.

Alluvial soils, typically the subject of liquefaction studies, are present within the general Eagle Mountain area. Since the depth of groundwater is approximately 340 feet below grade, liquefaction potential is considered to be low at the site of the proposed reclamation project.

No large bodies of water or water storage facilities exist upgradient of the site. The potential for flooding due to dam or levee failure is considered to be nonexistent.

Most of the northern project area contains gently to moderately sloping terrain, and the central project area contains a pit where a series of benches with corresponding steep backslopes have been constructed for mining purposes. The hillside areas north of the East Pit are underlain by hard bedrock with little or no soil cover and do not appear to be landslide-prone. However, some relatively shallow slumping on the surface could occur with ground shaking where water is concentrated within these hillside areas.

Loose, fractured rocks and boulders are present within the benches and backslopes of the East Pit and in the waste rock dumps. Approximately 50 to 70 percent of the northerly and southerly facing pit wall backslopes within the East Pit area contain loose rock material up to four feet in diameter. A strong seismic event could trigger some slope failures within the existing pit walls and would present a high rockfall risk where loose materials become dislodged from the benches.

Mitigation

The effects of seismic shaking can be satisfactorily mitigated through compliance or conformance with appropriate Riverside County ordinances (Uniform Building Code). Other mitigation measures for specific on-site hazards include:

1) Secondary Seismic Hazards—Progressively scale loose rock and materials on benches immediately above the working face of the landfill.

2) Handling of Oversized Rock—Scale the benches above the working face of landfill. Construct berms to intercept fallen rock.

TABLE 42
ACTIVE FAULT ZONES NEAR PROJECT AREA

Fault Name	Distance from Site (miles)	Maximum Characteristic Earthquake (M)
Blue Cut	21	6.8
Pinto Mountain	25	7.3
Bullion Mountain	26	6.2
San Andreas	34	7.5
Mesquite Lake	35	7.0
Ludlow	44	6.2
Banning	45	6.4
Emerson	55	6.4
Hidalgo	56	6.8
San Jacinto (Casaloma-Clark branch)	57	7.1
Calico	60	7.0
San Jacinto (Coyote Creek branch)	62	6.6

Significance After Mitigation

Seismic ground shaking could trigger slope failures and rockfalls within the existing pit walls and where loose materials become dislodged from the benches. These impacts, however, can be mitigated to insignificance by the mitigation measures listed above.

b. Reduced Landfill Operations Alternative

Impact

This alternative would result in the same seismic hazard impacts discussed above in relation to the proposed action.

Mitigation

The same mitigation measures indicated for the proposed action would apply.

Significance After Mitigation

Potentially significant seismic hazard impacts would be reduced to levels of insignificance by the recommended mitigation measures.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would result in the same seismic hazard impacts discussed above for the proposed action alternative.

Mitigation

The same mitigation measures identified for the proposed action would apply.

Significance After Mitigation

Significant seismic hazard impacts would be reduced to levels of insignificance by the recommended mitigation measures.

d. No Action Alternative

Impact

If development does not occur, no on-site structures will be impacted by geologic events occurring in the area.

Mitigation

No mitigation measures will be necessary.

Significance After Mitigation

There would be no potentially significant impacts to on-site structures.

3. Mineral Resources

Assumptions and Assessment Guidelines. This section assesses the availability of the mineral resources at the Eagle Mountain Mine and the impacts associated with covering those resources by the landfill or by transferring public lands to private ownership and vice versa. By comparing the potential loss of mineral reserves with total domestic reserves a level of significance can be assigned. Any unmitigated loss of mineral reserves is a significant impact to mineral resources.

a. Proposed Action

Impacts

Sequence I (0 to 10 years) of landfill operations would conform to the East Pit - Midsection mineral resource area. Landfill development in this area would thus prevent the open pit mining of 4.8 million metric tons (or 2.8 percent) of the remaining mineral reserves at the Eagle Mountain Mine.

Sequence II (11 to 75 years) of landfill operations would take place in the East Pit - West Extension ore resource area, which contains approximately 6.8 million metric tons (or 4.0 percent) of the remaining mineral reserves. This resource area, however, has a high stripping ratio of almost five tons of overburden per ton of ore and is thus considered by Kaiser to be an underground mineral reserve (i.e., not an open pit ore reserve). Sequence II of landfilling operations would seriously impact such underground mining economically, but not completely preclude it. Landfill operations conducted in subsequent sequences (i.e., Sequence III and the Final Sequence) would have similar impacts on underground mining potential.

The undeveloped portion of the Central Pit resource area, located east of the current Central Pit limits, would be impacted by landfilling operations late in Sequence III (76 to 85 years). This encroachment would prevent the mining of approximately 20.4 million metric tons (or 12 percent) of the remaining open pit reserves at the mine. The remaining 44.6 million metric tons (or 25.9 percent) of the reserves are outside of the project area and thus would not be affected by the landfill project.

The Final Sequence (86 to 115 years) of landfill operations would impact the extreme eastern portion of the East Pit deposits (East Pit - Alluvial). These deposits contain approximately 21 million metric tons (or 12.6 percent) of the remaining open pit reserves, primarily as an iron ore placer deposit.

Approximately 72.7 million metric tons (or 42.6 percent) of iron reserves in the Black Eagle - North and South resource areas would be unaffected by the landfill project.

No precious metals were detected in the proposed landfill project area or areas accessed by the Eagle Mountain rail line.

As discussed above, landfill operations would result in the following adverse impacts on recoverable mineral resources contained in the East Pit - Midsection, Central Pit, and East Pit - Alluvial ore resource areas:

Loss of access to 4.8 million metric tons of iron ore located in the East Pit - Midsection (or 2.8 percent of the remaining reserves at the Eagle Mountain Mine) if these reserves are mined prior to commencement of the landfilling operations.

Loss of access to an additional 41.4 million metric tons of iron reserves located in the East Pit - Alluvial and Central Pit deposits (or 24.3 percent of the remaining open pit ore reserves at Eagle Mountain) if these ore reserves are not mined prior to the commencement of landfilling operations in each of these areas.

Loss of most reasonable and economic access to 6.8 million metric tons of underground mineable resources in the East Pit - West Extension (or 4.0 percent of the mining reserves at Eagle Mountain) if these reserves are not mined to commencement of landfilling operations in this area.

The proposed action does not include any active mineral exploration or mining activities at Eagle Mountain.

Iron is one of the most plentiful elements in the world, constituting about five percent of the world's crust by weight (Labys 1980). Although there are many types of iron-bearing materials, the two most widely distributed are hematite and magnetite. According to the United

States Bureau of Mines (1991), 1990 world iron resources are estimated to exceed 800 billion metric tons of crude ore containing more than 230 billion metric tons of iron. The largest concentrations of the world's iron ore reserves are in the Soviet Union, Australia, Canada, United States, Brazil, and China (U.S. Bureau of Mines 1991). Many countries in the world produce iron ore with high iron content (i.e., more than 50 percent), which constitutes a direct-shipping ore. U.S. iron resources are estimated to be about 110 billion metric tons of ore containing approximately 27 billion metric tons of iron (U.S. Bureau of Mines 1991). Of these resources, only 16.1 billion metric tons of reserves (containing 3.8 billion metric tons of iron) are considered to be economically recoverable (U.S. Bureau of Mines 1991). Virtually all U.S. iron produced requires concentrations and pelletization (U.S. Bureau of Mines 1991).

The landfill operations at the Eagle Mountain Mine would result in the following losses in terms of economically recoverable U.S. iron reserves, if the specified reserves are not mined prior to commencement of landfilling operations:

East Pit - Midsection Resources: Loss of 4.8 million metric tons or 0.03 percent of economically recoverable U.S. iron reserves.

East Pit - Alluvial and Central Pit Resources: Loss of 41.4 million metric tons or 0.26 percent of economically recoverable U.S. iron reserves.

East Pit - West Extension: Loss of most reasonable and economic access to 6.8 million tons or 0.04 percent of U.S. iron reserves.

Landfill development could result in beneficial impacts to open pit mining at Eagle Mountain. Mining at Eagle Mountain is dependent on the availability of rail service over Kaiser's 52-mile rail line. With suspension of mining activities, use of this rail line was discontinued in 1986. Landfill development would result in reactivation of this rail line, which could also be available for transport of iron ore concentrates or rock products. If, in the future, Kaiser Steel Resources, Inc., wishes to recover iron reserves or rock products at the Eagle Mountain Mine, they would apply for an amended rail right-of-way to allow mining uses. Any such future mining would require environmental review and land use permits.

Landfill development would share many of the costs that a small mining operation would otherwise bear alone, such as capital and operation and maintenance costs for the railroad, haul roads, electrical and water distribution systems, and maintenance and warehousing facilities.

Any future mining activities would, in turn, benefit landfill development. Namely, overburden and plant tailings would be available to the landfill as cover material. In addition, mining excavations within the perimeter of the landfill would increase the available capacity of the landfill.

Mitigation

The impacts of landfilling on mineral resources could be satisfactorily mitigated by the sequencing of landfilling operations, which would assure that the most potentially minable iron resources are impacted last. Such sequencing would provide sufficient time (i.e., 75 years) to recover the ore contained in the Central Pit and East Pit - Alluvial ore reserves of Eagle Mountain if economically justified. However, if these areas are not mined before their respective impacting phases of landfilling operations commence, access to these resources would be lost.

Loss of access to the ore reserves contained in the East Pit - Midsection and West Extension is not considered a significant impact.

Significance After Mitigation

Significant mineral resources impacts would be reduced to levels below significance by the project sequencing.

b. Reduced Landfill Operations Alternative

Impacts

This alternative may potentially result in adverse impacts on the East Pit - Midsection and Central Pit iron ore resource areas. The potential impacts are as follows:

> Loss of access to 4.8 million metric tons of iron ore reserves contained in the East Pit - Midsection (or 2.8 percent of the remaining open pit ore reserves at Eagle Mountain), if the Central Pit ore resource area is not mined prior to commencement of landfill operations.
>
> Loss of access to an additional 20.4 million metric tons of iron reserves contained in the Central Pit area (or 12 percent of the remaining open pit reserves at Eagle Mountain), if this area is not mined prior to commencement of landfilling operations in this area.
>
> Loss of most reasonable and economic access to 6.8 million metric tons (or 4.0 percent) of underground mineable resources in the East Pit - West Extension if this area is not mined prior to commencement of landfilling operations in this area.

This alternative would result in the same beneficial impacts discussed above for the proposed action. This alternative would not impact the East Pit - Alluvial section, which contains 21 million metric tons of iron ore reserves.

Mitigation

The same mitigation measures discussed for the proposed action would apply.

Significance After Mitigation

Significant mineral resources impacts would be reduced to levels below significance by the project sequencing.

c. Proposed Action with Rail Access Only Alternative

Impacts

This alternative would result in the same mineral resources impacts as for the proposed action.

Mitigation

The same mitigation measures discussed for the proposed action would apply to this alternative.

Significance After Mitigation

Significant impacts to mineral resources would be mitigated to levels below significance by the project phasing.

d. No Action Alternative

Impacts

If development of the landfill does not occur, no on-site mineral resources would be impacted.

Mitigation

No mitigation would be required.

Significance After Mitigation

No significant impacts were identified.

J. Visual, Recreation, and Wilderness Resources

The landfill construction and operations, the BLM/Kaiser Steel Resources, Inc., land exchange, the Eagle Mountain rail line and Eagle Mountain Road Extension right-of-way grants, and Riverside County Plan Amendment will have no significant impacts on visual, recreation, and wilderness resources. The following discussion provides a detailed evaluation of the effect of the proposed action on visual contrast, views, windblown debris and dust, night lighting, recreation, and wilderness.

1. Visual Contrast

Assumptions and Assessment Guidelines. The visual assessment of the study area has utilized the BLM's Visual Resource Management System (BLM n.d.). Landscape character types were defined and scenic quality evaluated in the context of the regional landscape character. KOPs and corridors were established and the visual sensitivity of the project area was determined based on the views from these points. A visual contrast rating was completed for the existing and proposed conditions of the project area. An increase in visual contrast is considered to be a negative impact while a decrease in visual contrast is considered a positive impact.

a. Proposed Action

Impact

The impact of the proposed landfill operations on visual contrast will be discussed here in terms of the BLM's visual contrast rating method and the visual management objectives for VRM Classes III and IV as determined for this project.

Within the Class IV area, the visual contrast of existing disturbed conditions with the adjacent undisturbed areas is strong and currently does not meet the VRM Class IV objectives because the past mining and associated activities do not repeat the form, line, color, and texture of the surrounding landscape. The completed landfill will be noticeable from some KOPs and will begin to attract attention and dominate the characteristic landscape, but the landform will repeat the basic elements inherent in the characteristic landscape, thus meeting the Class IV objectives.

Within the Class III area, the management objectives are and will be met: there will be little or no visual contrast created. This area will remain undisturbed/ungraded until the final phases of landfill construction, and even then, only minimal grading (if any) will occur in this area.

The following features are included in the project design which would reduce the visual contrast level and meet the Class IV visual management objectives. The result of the design features on visual contrast effects is considered a positive impact.

Location. The project is located in an area that is not highly visible from most KOPs. Background distances and topographic features which block views of the area contribute to this.

Design. The shape and mass of the landfill area, although not exactly recreating the original topographic conditions, will blend in with the adjacent landforms more than the existing graded areas do. The linear bands created by the slope-and-terrace grading will eventually be covered and no longer visible. The form will be a series of three connected and gently rounded mounds that increase in elevation from east to west as does the adjacent north ridgeline of the Eagle Mountains. The color and tone contrast of the final cover will be minimized by using the coarse tailing for cover blending with the adjacent soil colors. The final color tone will blend in with the adjacent tones to compensate for the variations in shade and shadow. The texture will not be as coarse as adjacent undisturbed areas.

Minimizing Disturbance. The grading and landfill limits shall be clearly staked or fenced to minimize disturbance to areas not required for landfill operations. Construction access will be controlled. Where possible, container handling and other ancillary activities will take place in existing use areas so that grading of undisturbed vegetated areas will be avoided or minimized.

Revegetation. Revegetation of the areas disturbed by landfill is expected to occur naturally since the final cover will be similar to the native surface. This natural process will be enhanced by including a layer of prepared soil mix in the top layer of the landfill surface cover which is capable of supporting vegetative growth. A seed mix of native plants will be incorporated into the surface cover to expedite the natural revegetation process.

The railroad and Eagle Mountain Road right-of-way grants will have no impact on visual contrast levels. The construction of the new railroad spur and the northern extension of Eagle Mountain Road would create a slight visual contrast with adjacent areas, but the impact would not be significant.

The land exchange, consisting of offered and selected lands, would result in disturbed areas of high visual contrast being exchanged for non-disturbed desert areas of low visual contrast, which is considered a positive impact.

Mitigation

No significant visual contrast impacts are identified for the proposed action. The project design includes such features as facilities location and design, minimization of ground disturbance, and revegetation of disturbed areas. Implementation of these features will result in a positive effect of visual contrast.

Significance After Mitigation

No significant visual contrast impacts were identified with the proposed action. A positive visual effect will result from implementation of the design features listed above.

b. Reduced Landfill Operations Alternative

Impact

This alternative would result in a reduction in the daily inflow of waste and a reduction in the size of the landfill footprint. An incremental reduction in visual contrast would occur with this alternative and incremental improvements over the proposed action would result. This is considered a positive effect.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant adverse impacts were identified with this alternative. A positive effect would result due to the visual contrast improvements provided by project design features.

c. Proposed Action with Rail Access Only Alternative

Impact

The issue of limiting access does not change the evaluation of visual contrast. Impacts from this alternative would be the same as the proposed action, resulting in a positive effect.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant adverse impact is identified with this alternative. A positive visual contrast effect would result due to incorporation of the project design features.

d. No Action Alternative

Impact

The No Action alternative will maintain current strong levels of visual contrast which exceed the objectives of Class IV.

Mitigation

No mitigation is identified.

Significance After Mitigation

Visual impacts with this alternative do not meet Class IV objectives and are considered negative and significant.

2. Views from Desert Center and Other KOPs

Assumptions and Assessment Guidelines. The visual assessment of the study area has utilized the BLM's Visual Resource Management System (BLM n.d.). Landscape character types were defined and scenic quality evaluated in the context of the regional landscape character. KOPs and corridors were established and the visual sensitivity of the project area was determined based on the views from these points. A visual contrast rating was completed for the existing and proposed conditions of the project area. An increase in visual contrast, as observed from Desert Center and other KOPs, is considered to be a negative impact, while a decrease in visual contrast is considered a positive impact.

a. Proposed Action

Impact

As described under the existing conditions section, the distant views of the project area from Desert Center, Lake Tamarisk, and Interstate 10 are significantly obstructed by the steep hills in the middle ground. For this reason, the visual impact of the landfill on these areas is low. Figures 90 through 95 show cross sections through the landfill and a location map. During the first several decades of operation, the landfill operations will be below grade and not visible. Eventually, the upper elevation of landfill area as it nears completion will be slightly visible as a rounded ridgeline against the background of the north ridge of the Eagle Mountains. The project area views from State Highway 177 are so far in the distance that the visibility is very low and future visibility of the completed landfill will be low. It will be difficult to distinguish between the landfill and the surrounding Eagle Mountains.

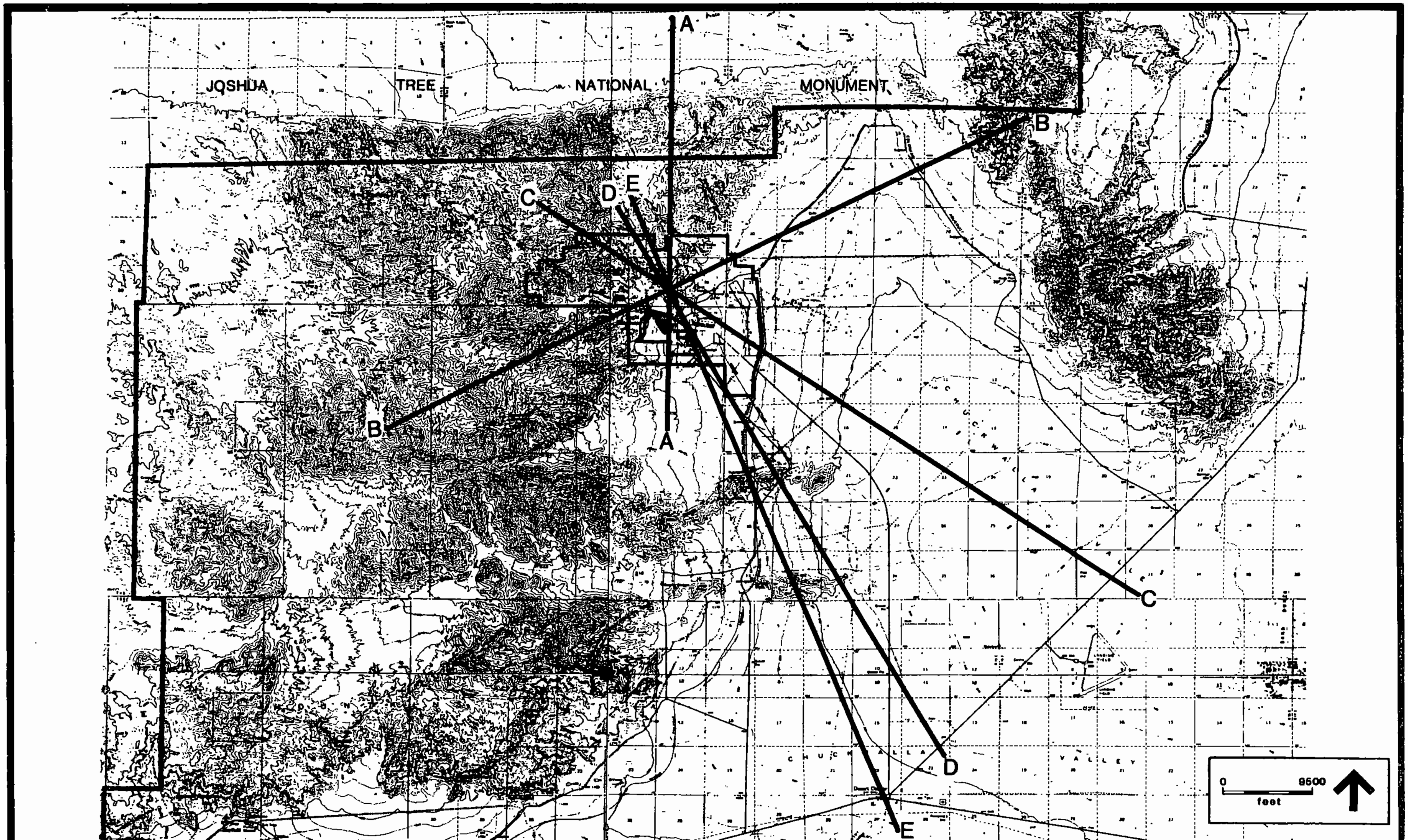


FIGURE 90. CROSS SECTION LOCATIONS

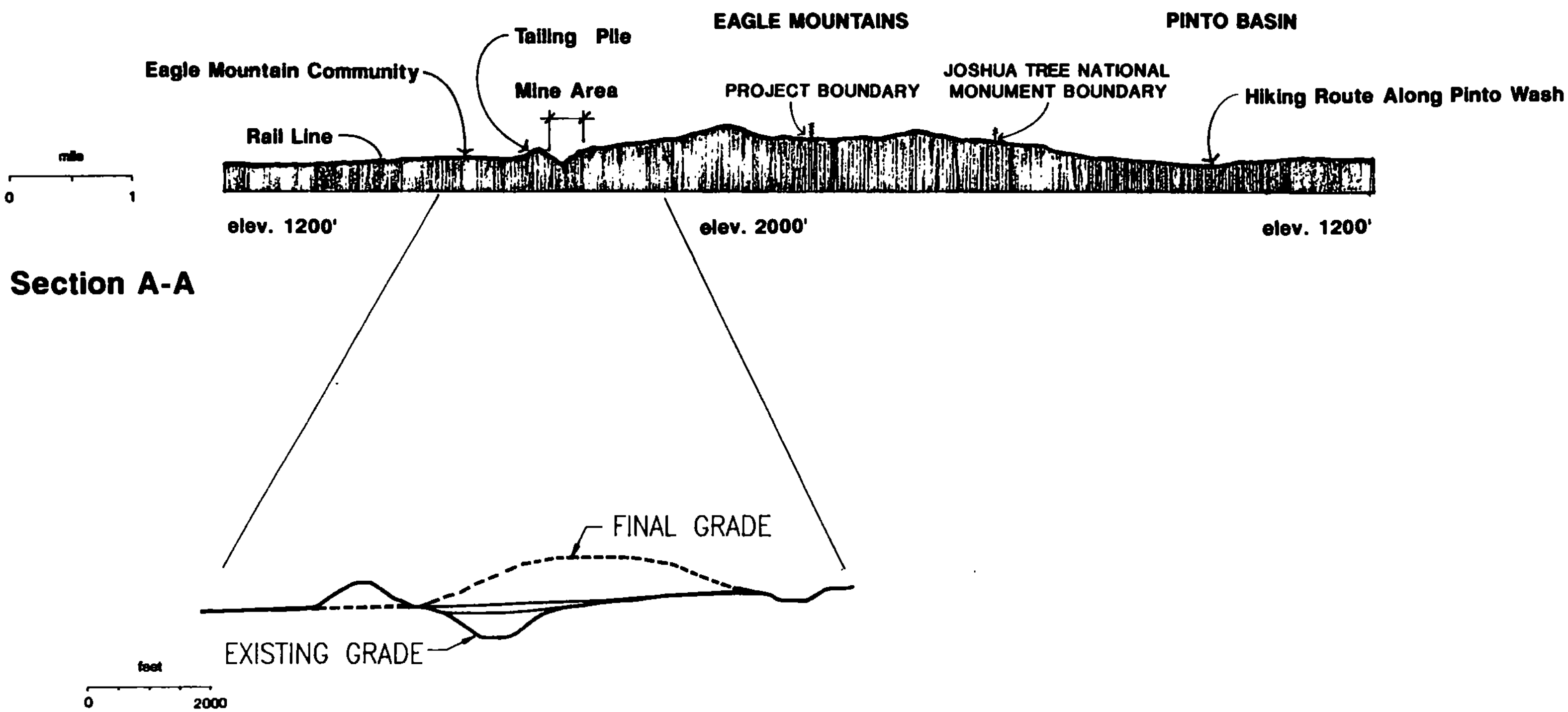


FIGURE 91. CROSS SECTION A-A

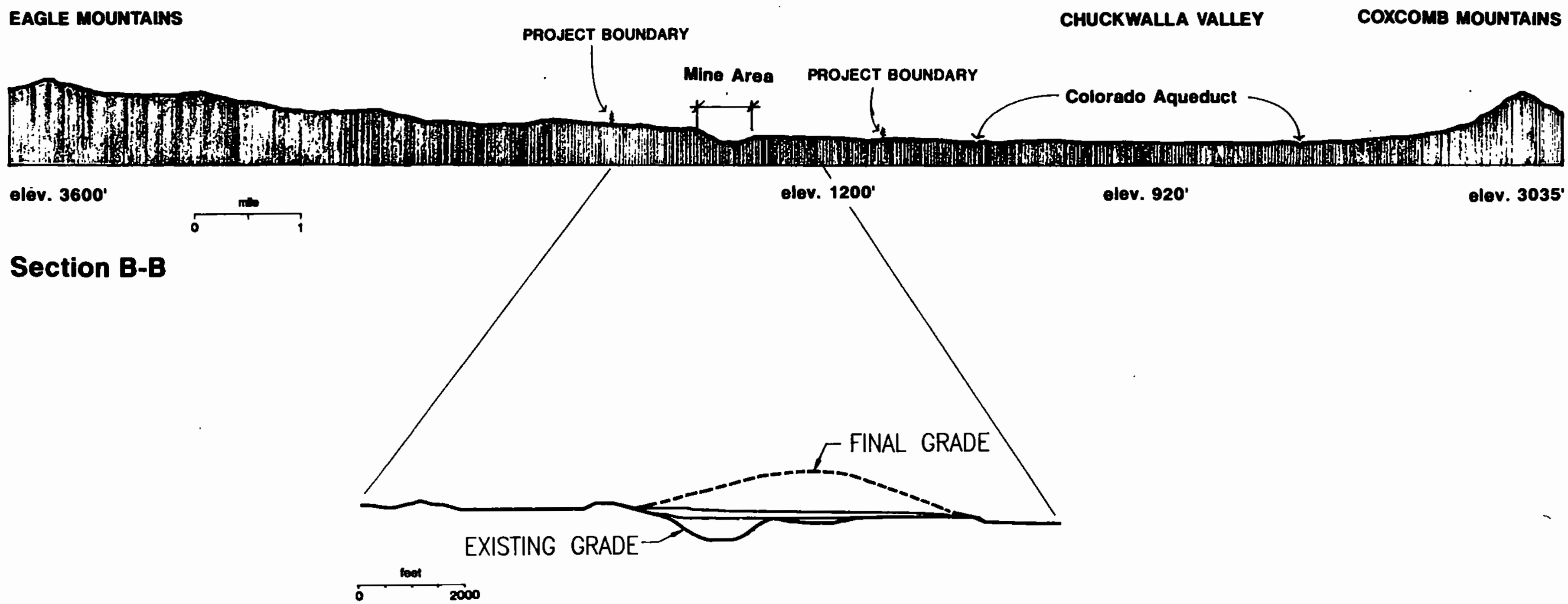


FIGURE 92. CROSS SECTION B-B

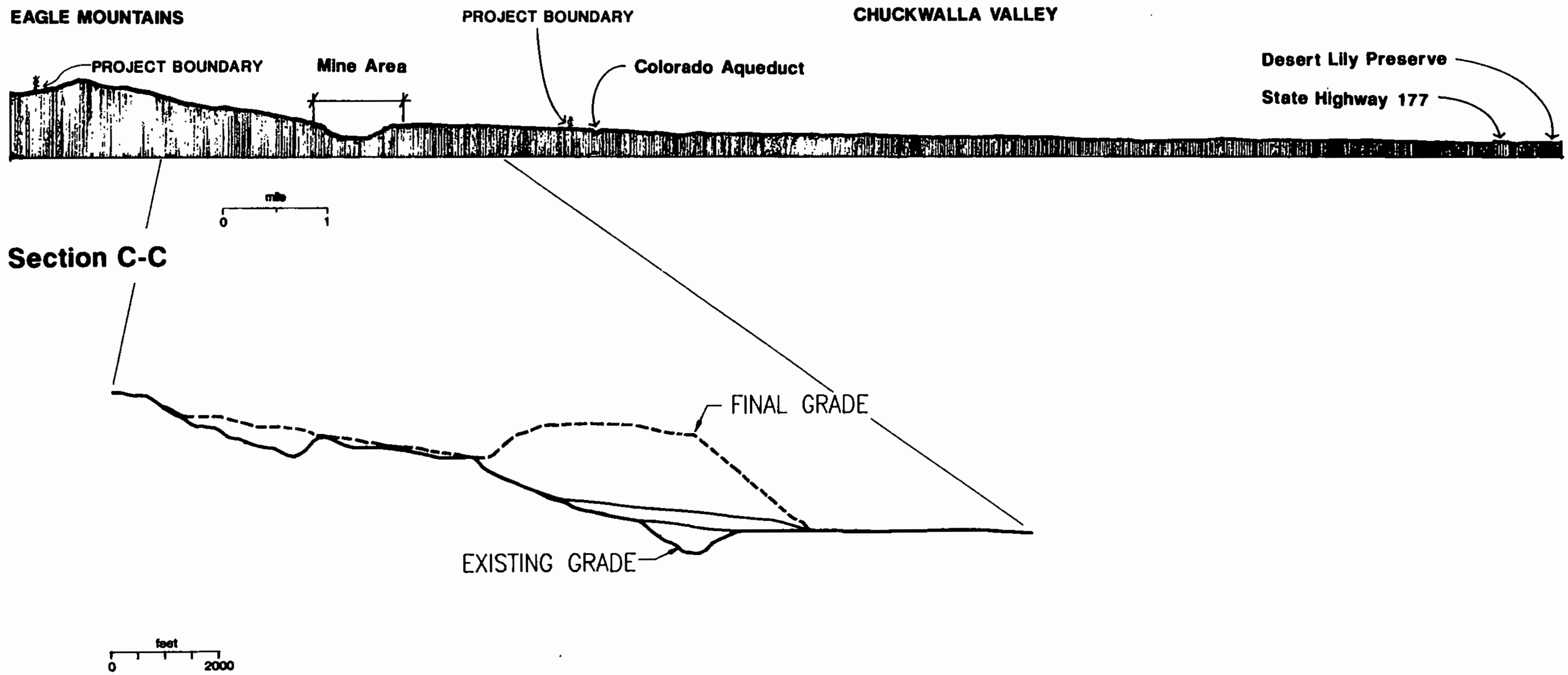


FIGURE 93. CROSS SECTION C–C

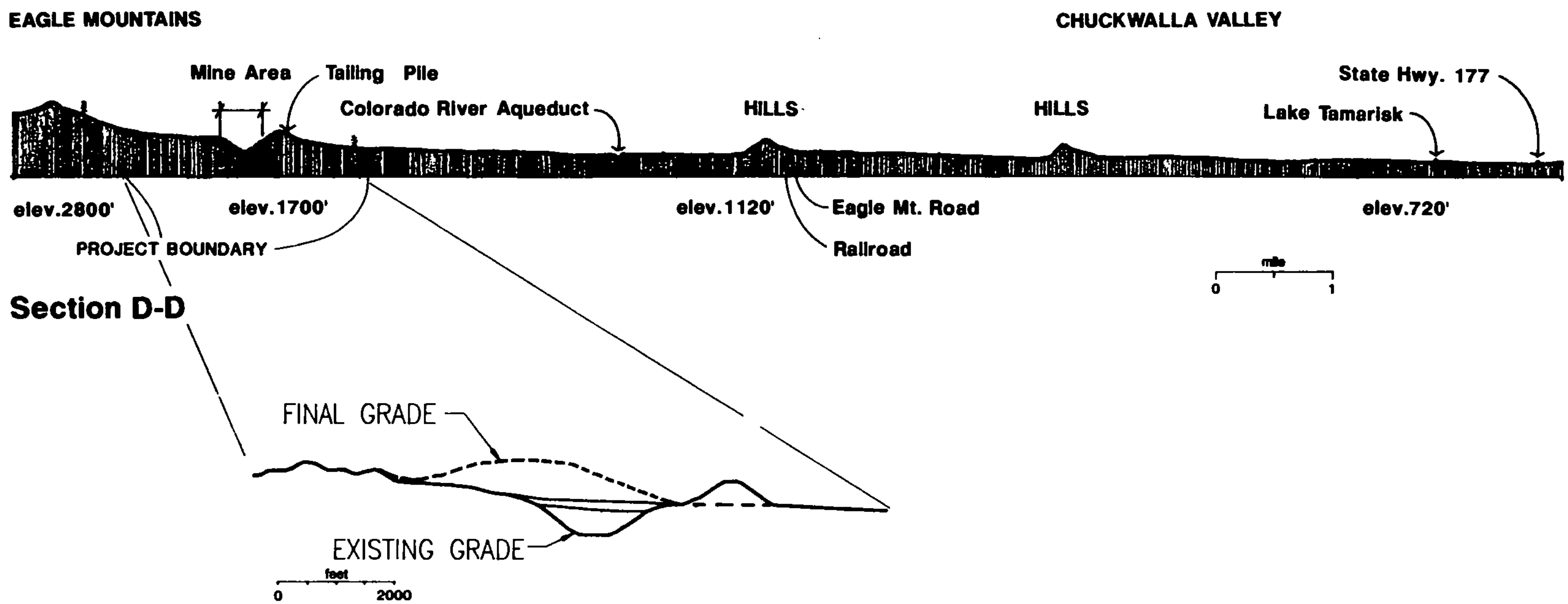


FIGURE 94. CROSS SECTION D-D

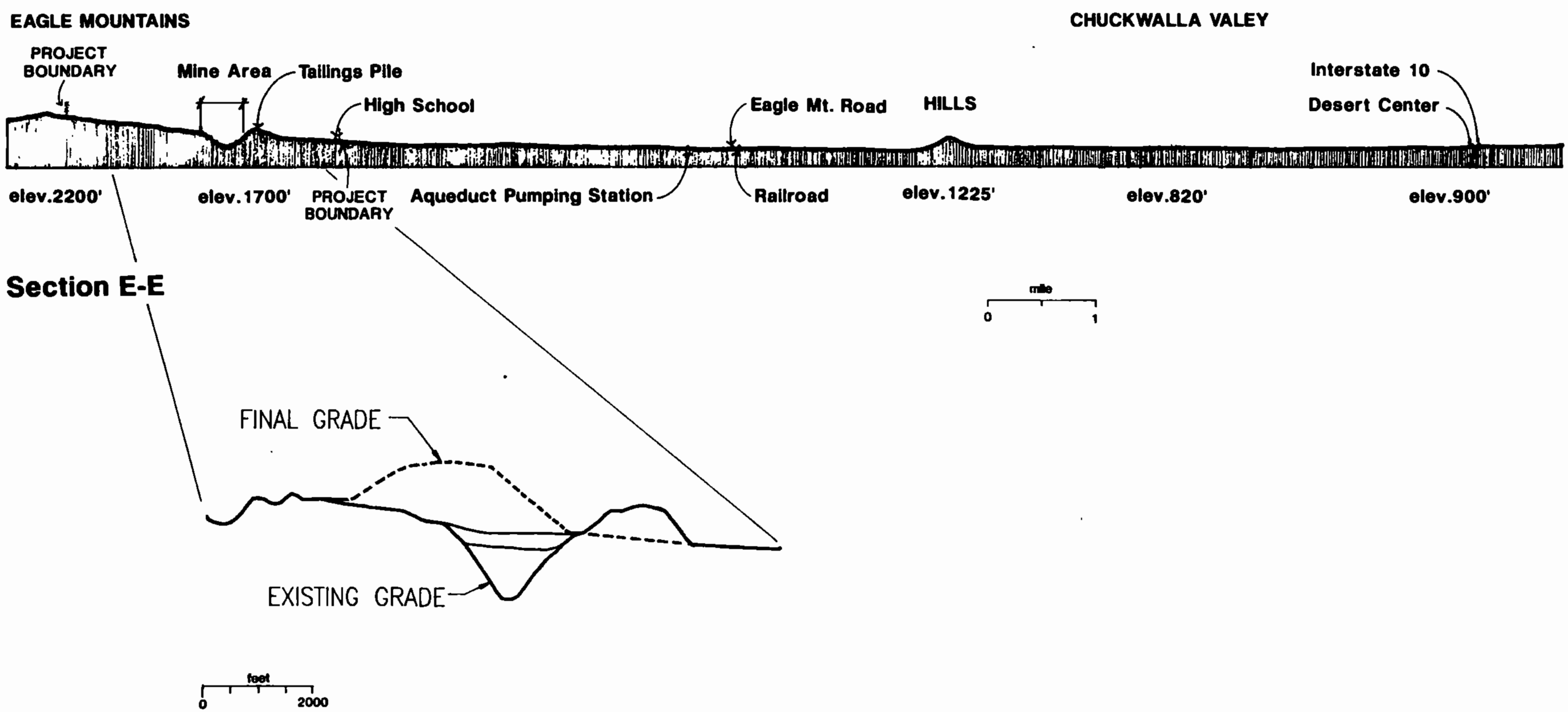


FIGURE 95. CROSS SECTION E-E

The implementation of several features included in the project design would reduce visual impacts to below a level of significance. These are as follows:

Visual Contrast Reduction. The level of visual contrast will be reduced by the mitigation measures described previously under visual contrast (location, design, minimizing disturbed areas, and revegetation).

Project Phasing. The initial phases of the project will be filling the western portions of the proposed landfill area. Landfill operations will be screened by the intervening natural topography, existing vegetation, and distances. Final phases and the completed landfill may be seen, but the landforms created will provide an approximation of the original topographic conditions.

Truck Traffic Routing. Truck traffic to the container yard will use I-10 and Eagle Mountain Road rather than going through Desert Center on Kaiser Road past Lake Tamarisk and other residences.

The impact of the proposed landfill operations on the views from these distant viewing points will be an improvement on visual quality. Upper-elevation slopes in the project area that can now be seen as the lighter scars will be covered and/or screened from view by the landfill. The final form and configuration of the landfill will blend in more with the adjacent landforms than the existing conditions and will be less visible as a result. Visual contrast will be reduced and a positive visual impact will result.

The railroad and Eagle Mountain Road right-of-way grants will have no impact on views from Desert Center or other KOPs. The new railroad spur and the northern extension of Eagle Mountain Road would have an insignificant impact, if any, on views from those points. The reactivation of the train and the additional truck traffic will create a slight visual contrast, but the impact would be insignificant.

The land exchange, including the exchange of private and public lands, will have no impact on views from KOPs.

Mitigation

The project design includes measures such as project phasing, routing of truck traffic, and implementation of the design features mentioned above to improve visual contrasts. These measures will minimize visual effects. No additional mitigation is required with the proposed action.

Significance After Mitigation

No significant visual impact was identified with the proposed action.

b. Reduced Landfill Operations Alternative

Impact

The effect of reducing the size of the landfill footprint and the inflow of waste would be to decrease the visual contrast in views from Desert Center and other KOPs. The final form and configuration of the landfill will blend in more with the adjacent landforms than the existing conditions and will be less visible as a result. The overall visual effect would be an incremental improvement to the proposed action which is considered a positive visual impact.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

No significant visual impact was identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

The decrease in truck traffic would not be noticeable since that traffic is routed to Eagle Mountain Road rather than Kaiser Road. Impacts from this alternative would be incrementally improved over the proposed action, resulting in a positive effect.

Mitigation

Mitigation would be the same as for the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative.

d. No Action Alternative

Impact

Current visibility of upper slopes would be maintained, with the resulting low visual impact.

Mitigation

No mitigation would be required with this alternative.

Significance After Mitigation

No significant impacts are associated with this alternative.

3. Views from Eagle Mountain Townsite

Assumptions and Assessment Guidelines. The visual assessment of the study area has utilized the BLM's Visual Resource Management System (BLM n.d.). Landscape character types were defined and scenic quality evaluated in the context of the regional landscape character. KOPs and corridors were established and the visual sensitivity of the project area was determined based on the views from these points. A visual contrast rating was completed for the existing conditions of the project area. An increase in visual contrast, as observed from the Eagle Mountain townsite, is considered to be a negative impact, while a decrease in visual contrast is considered a positive impact.

a. Proposed Action

Impact

It is anticipated that the landfill operation will have a positive impact on the community of Eagle Mountain. There will be an increase in activity levels and population and a renewed interest in improving the visual quality of the area. The actual landfill operations will not be visible for many years, as they will be screened from view by the existing tailing pile and the berms containing the tailing ponds. The tailing pile will decrease in height over time as it is used for cover material. At project completion, the tailing pile will be gone, and the landfill itself will rise 900 to 1,500 feet above the elevation of the community. Although large in scale, the landfill is smaller in mass and scale than the surrounding Eagle Mountains, which establish the visual context. The proposed action will have a significant impact on the views from the community of Eagle Mountain. However, that impact will be dissipated over time with landfill operations not even seen for several decades. Visual contrast will be decreased over time, resulting in a net positive impact.

Several features are incorporated into the project design which would reduce potential impacts to a level below significance. The net result will be an increase in visual quality within the community and a moderate impact on views due to the landfill. This is not considered to be a significant impact. These design features are as follows:

Project Phasing. During the first several decades of operation, landfill activities will take place below grade within the western portions of the proposed landfill area and will not be seen by the community.

Location. The base of the landfill will be at least one-half mile away from the closest homes, reducing the impact on area residents.

Incremental Revegetation. Revegetation will proceed as completed landfill areas reach final grade and receive final cover. This phased approach will be used so that when the landfill is complete, revegetation will already be established for much of the surface area.

Improved Visual Quality Within the Community: Clean-Up and Tree-Planting Programs. Since the mine ceased active operations, the priorities for the area have appropriately been security and safety—not aesthetics. A large section of the residential area has been fenced, trees have died or are dying, and building demolition debris remains in scattered piles. The overall impression is one of neglect and abandonment. The initiation of landfill activities will bring with it an influx of residents growing in number as the operations reach their maximum potential. Existing homes will be repaired and upgraded as necessary to provide an adequate amount of housing for landfill employees choosing to live here.

Aerial photographs from 1981 indicate a large number of canopy trees lining the streets and planted around homes. Since then, many of these trees have died. As the population at Eagle Mountain is reestablished, it is expected that tree planting would again occur. An active tree planting program is one of the most significant measures that can be taken to improve the visual quality of the community. The scale of the landfill is such that it will always have a dominant visual presence, but a large number of trees along streets and around homes would create a more human scale and a sense of enclosure and would shift the focus away from the landfill. The tree canopies will partially screen and break up views of the landfill, decreasing its visual dominance. The shade created will reduce residential energy costs and make the community more habitable. Trees selected will be low-water-using trees indigenous to the area, such as ironwood and palo verde, as well as desert-adapted trees. Irrigation with nonpotable water will be provided during the initial establishment period.

The railroad and the Eagle Mountain Road right-of-way grants and the exchange of public and private lands will have no impact on views from the Eagle Mountain townsite. The new railroad spur and the northern extension of Eagle Mountain Road will have an insignificant impact on views from the townsite because truck traffic and the new railroad spur will not be routed through the townsite.

Mitigation

The project design includes features such as project phasing, distance of landfill from Eagle Mountain, revegetation, and implementation of community clean-up programs. These measures will improve existing visual effects from the Eagle Mountain townsite. No additional mitigation is required with this alternative.

Significance After Mitigation

No significant impacts were identified. A positive visual effect would result from implementation of the project design features.

b. Reduced Landfill Operations Alternative

Impact

The reduction in size and scale of the landfill operations would serve to reduce incrementally the visual impact as compared to the proposed action. The ridgeline of the Eagle Mountains would be seen above the silhouette of the landfill, providing a visual backdrop and making the landfill appear smaller in scale. The distance from the residential areas would remain the same as in the proposed action. The net result after implementation of the project design features listed above will be an increase in visual quality within the community and a moderate impact on views due to the landfill. This is not considered to be a significant impact.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative. A positive visual effect would occur upon implementation of the project design features.

c. Proposed Action with Rail Access Only Alternative

Impact

A reduction in truck traffic to the landfill site will not affect views from the Eagle Mountain community. The net result of this alternative after implementation of the project design features will be an increase in visual quality within the community and a moderate impact on views due to the landfill. This alternative represents an incremental improvement over the proposed action and is not considered to be a significant impact.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative. A positive visual effect would occur upon implementation of the project design features.

d. No Action Alternative

Impact

Currently, the views from the community are significantly impacted by the imposing tailing pile, the exposed slopes, and scarred areas. This high level of impact would remain. Furthermore, the visual quality of the community itself would remain low.

Mitigation

No mitigation is identified.

Significance After Mitigation

A significant impact is associated with this alternative.

4. Windblown Debris and Dust

Assumptions and Assessment Guidelines. The landfill will operate under a "No Visible Dust" policy, as described in the Air Quality section of this document. An increase in the amount of windblown debris and/or dust, attributed to project-related activities, is considered a significant impact.

a. Proposed Action

Impact

The potential impact of windblown debris, including dust and litter, from landfill operations, is a significant concern shared by Joshua Tree National Monument and BLM staff as well as by residents of the area. The landfill could be a source of litter and dust and the unpaved roadbeds and other exposed areas could be a source of dust. From the Pinto Basin area and hiking route, any dust rising above the north ridgeline of the Eagle Mountains would be highly visible and would detract from the wilderness characteristics of the area. The sparse vegetative cover would not provide visual screening, and in fact, the native plants could trap litter in the branches or spines, increasing the visibility and negative visual impact.

Seasonal storm patterns for this area pose a particular concern. The summer rainstorms frequent in July and August are characterized by a buildup of clouds and strong isolated winds. The storms are intense and the prevailing directional winds from the south and southeast could scatter litter well into the Eagle Mountains, the Pinto Basin area, and beyond. The pickup and retrieval of the debris in wilderness areas would have to be done on foot since no vehicular access is allowed.

Private property owners share similar concerns. Windblown litter is not only a visual blight, but a nuisance to retrieve. Rising dust clouds in the project area would be visible from residential areas. The design features listed below would ensure that the impacts due to windblown debris would be below a level of significance.

Project Phasing. During the first two decades of operation, landfill activities will take place below grade within the East Pit, reducing potential for escaped litter. Fencing and regular patrolling of the perimeter areas are measures that will be taken during subsequent phases.

Material Handling. Incoming refuse materials will be brought to the site in closed containers or vehicles, then transported to the working face of the landfill by truck. Only then will the containers be opened and materials deposited. Once deposited, the refuse will be compacted then covered on a daily basis with a six-inch-minimum layer of coarse tailing. The waste inspection facility will be fenced to prevent windblown debris. This limited and controlled handling and exposure of the refuse will minimize opportunities for windblown debris.

Cover Materials. The existing on-site coarse tailing will be utilized for the daily cover. This material was screened during processing, leaving a coarse tailing product material that will produce substantially less dust when applied as a cover material than native soils in the area.

Dust Control. Regular watering or paving of the haul roads within the project area will be included as a dust control measure. Similar measures will be taken during the construction of the new railroad spur and the northern extension of Eagle Mountain Road.

Operations Policy. The landfill will operate under a "No Visible Dust" policy, as described in the Air Quality section of this document.

Storm Watch/Early Warning Procedure. Landfill operators will implement an active storm watch and early warning procedure by which deposited uncovered materials can be quickly covered prior to imminent windstorms reaching the site. This would include visual observations as well as communication and coordination with adjacent public land management agencies that have weather information systems.

Accident Response. Landfill operators will develop a plan to ensure timely and complete cleanup of accidental spills. There will be sufficient vehicles, equipment, and personnel available to respond to accidents resulting in the spilling of refuse.

Communication and Follow-up. There will be operations personnel assigned to litter control that can be contacted directly when JTNM or BLM staff observe or receive reports of problems developing with windblown debris. This will include a follow-up by landfill operators to ensure the timely retrieval of stray litter.

The railroad and the Eagle Mountain Road right-of-way grants and the land exchange will have no impact on windblown debris and dust. The construction of both the new railroad spur and the paved northern extension of Eagle Mountain Road will be conducted with standard dust control measures such as spraying disturbed areas with water. Traffic along the railroad spur and the paved roadway is not expected to increase dust levels, and all transported landfill materials will be transported in containers to prevent windblown debris.

Mitigation

Implementation of the above project design features will greatly reduce the potential impact from windblown debris. Exposure of refuse will be minimal, and there will be ongoing dust control efforts. In the event of an accidental spill, sufficient equipment and personnel will be sent to the spill site to complete a timely cleanup. No additional mitigation would be required with the proposed action.

Significance After Mitigation

No significant visual impact is identified due to windblown debris and dust with the proposed action.

b. Reduced Landfill Operations Alternative

Impact

The effect of the reduced landfill alternative on the potential impact of windblown debris will be the same as the proposed action. Implementation of the project design features listed above will greatly reduce the potential impact from windblown debris. Exposure of refuse will be minimal and there will be ongoing dust control efforts. In the event of an accidental spill, sufficient equipment and personnel will be sent to the spill site to complete a timely cleanup. Impacts to windblown debris and dust are insignificant.

Mitigation

Mitigation for this alternative is identical with the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would result in a reduction of truck traffic and the associated potential for spill from a vehicular accident. Exposure of refuse will be minimal, and there will be ongoing dust control efforts. Implementation of the above-mentioned project design features will reduce greatly the potential impact from windblown debris. Minimal wind debris and dust impacts would occur and impacts are considered insignificant.

Mitigation

Mitigation is identical with the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative.

d. No Action Alternative

Impact

The current low level of impact will be maintained under this No Action alternative. At this time, the exposed slopes are somewhat stabilized in that dust has not been identified as a problem.

Mitigation

No mitigation is required.

Significance After Mitigation

No significant impacts are associated with this alternative.

5. Night Lighting

Assumptions and Assessment Guidelines. Visually prominent night lighting does not currently exist on the project site or along existing rights-of-way. Night lighting and illumination of the sky within the project site resulting from full floodlighting of facilities, the road right-of-way, and railroad corridor would be considered a significant impact.

a. Proposed Action

Impact

The potential for visually impacting the surrounding area by night lighting of landfill operations is potentially significant. Starry night skies are an asset enjoyed by area residents and by wilderness recreation area users. In the past, nighttime lighting of the mining activities was noticeable as a glow in the sky area above the mine and higher-elevation lights were visible from as far as 70 miles to the north (Heuston, JTNM, 11/89). The higher-elevation lighted areas were also highly visible from Interstate 10, Desert Center, and other area residences. Night lighting is made more conspicuous in the absence of other lighted areas, except the small amount of lighting at Desert Center and Lake Tamarisk.

The lighting of ground-level activities at the container handling yard and other lighting within the area is not anticipated to be visible from Pinto Basin. Points within the Coxcomb Mountains and the Eagle Mountains will be moderately impacted by the increased lighting partly because of the angle of view from these higher-elevation viewpoints. Visitor use of these areas is very low though, particularly at night.

The project lighting will have little or no impact on Desert Center and Lake Tamarisk because their views of ground-level activities to be lighted are screened by the steep hills in the foreground/middle ground. Lighting from truck traffic will not increase in these areas.

Implementation of the following project design features will reduce potential night lighting impacts to below a level of significance.

Limitation on Night Activities. Landfilling will be limited to daytime hours. The container handling yard activities may run around the clock; thus, nighttime activities will be limited to the operation of the container handling yard. This limitation on night activities is the most significant measure that can be taken to reduce visual impact.

Type of Lighting. Lighting that is required for safety and security will be directed and locational rather than flooding large areas with light. Fixtures will have horizontal cutoff type shields to direct the light downward and prevent the scattering of light upwards. Poles will be selected at the minimum height necessary to light the immediate area. New fixtures installed shall utilize low-pressure sodium lights.

Truck Traffic Routing. Truck traffic to the container handling yard would use Interstate 10 and the existing Eagle Mountain Road approximately two miles west of Desert Center. This will eliminate additional lighting from truck headlights along Kaiser Road, which is adjacent to most residences in the area.

The railroad and the Eagle Mountain Road right-of-way grants and the land exchange will have no impact on night lighting. Train traffic along the rail will have an insignificant impact associated with the train lights for the twice-nightly transport of landfill material. There will be no regularly scheduled truck traffic at night, and therefore, no night lighting impact is associated with the northern extension of Eagle Mountain Road. Neither the railroad corridor nor the road corridor itself will be lighted.

Mitigation

The project design features listed above, such as limiting nighttime activities, directing and shielding lighting, using low-pressure sodium lights, and appropriately routing truck traffic will minimize lighting impacts. No additional measures would be necessary.

Significance After Mitigation

No significant impact is identified with the proposed action.

b. Reduced Landfill Operations Alternative

Impact

This alternative would have the same effect as the proposed action.

Mitigation

Mitigation is identical with the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would have a slightly lower impact than the proposed action due to the reduction of truck headlight lighting along Eagle Mountain Road. Night-lighting impacts from this alternative are considered not significant.

Mitigation

Mitigation is identical with the proposed action.

Significance After Mitigation

No significant impact is identified with this alternative.

d. No Action Alternative

Impact

The No Action alternative would maintain current low-level impacts resulting from existing security lighting and lighting of homes.

Mitigation

No mitigation is required.

Significance After Mitigation

The impact is not considered to be significant.

6. Recreation

Assumptions and Assessment Guidelines. The current recreation values of the project area are low, due to the extensive open pit mine operation associated with the Eagle Mountain iron ore mine. Neither the existing or proposed railroad or Eagle Mountain Road rights-of-way or the land exchange properties have been identified as having recreational value. The evaluation of the proposed action's impact on recreation was based on the assumption that a net loss of existing recreation opportunities, a displacement of recreation uses, or a degradation of recreational value would constitute a significant impact.

a. Proposed Action

Impact

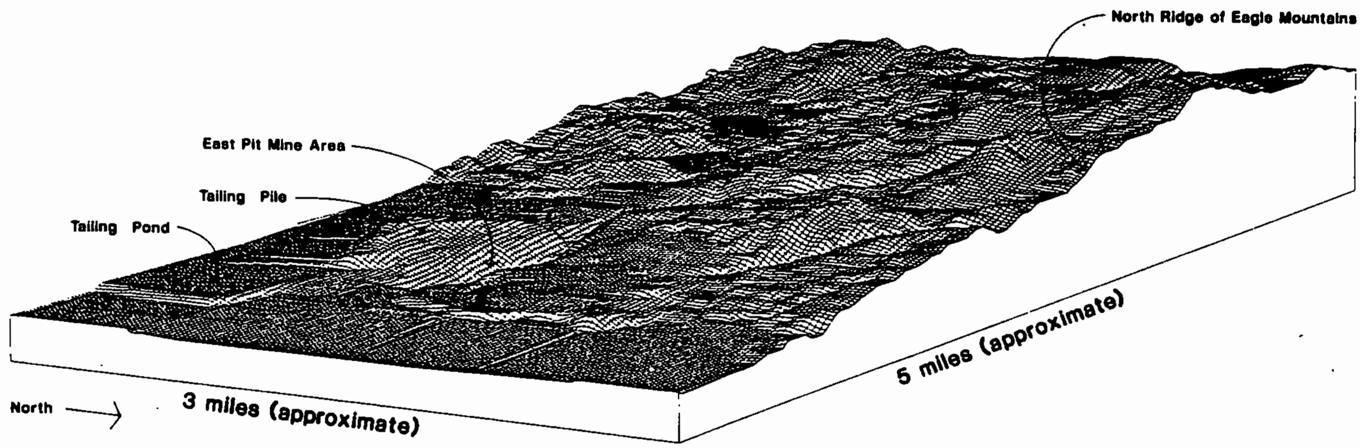
The landfill construction and operations, as allowed by the land exchange, right-of-way grant, and plan amendment, will have indirect impacts on recreation. These will be limited to insignificant visual impacts of the landfill operation on the views from certain vantage points within off-site recreational use areas. No direct impacts will occur to recreation resources: there are no designated recreation areas within the project boundaries, there will not be a reduction in size or surface of off-site recreation areas, nor will there be immediate physical effects to these resources.

The railroad and the Eagle Mountain Road right-of-way grants will have no significant impact on recreation. The land exchange will result in an increase in BLM lands that are undisturbed and a decrease in BLM lands that are significantly degraded. This is a positive impact. The new railroad spur and the northern extension of Eagle Mountain Road will have no impact on recreation.

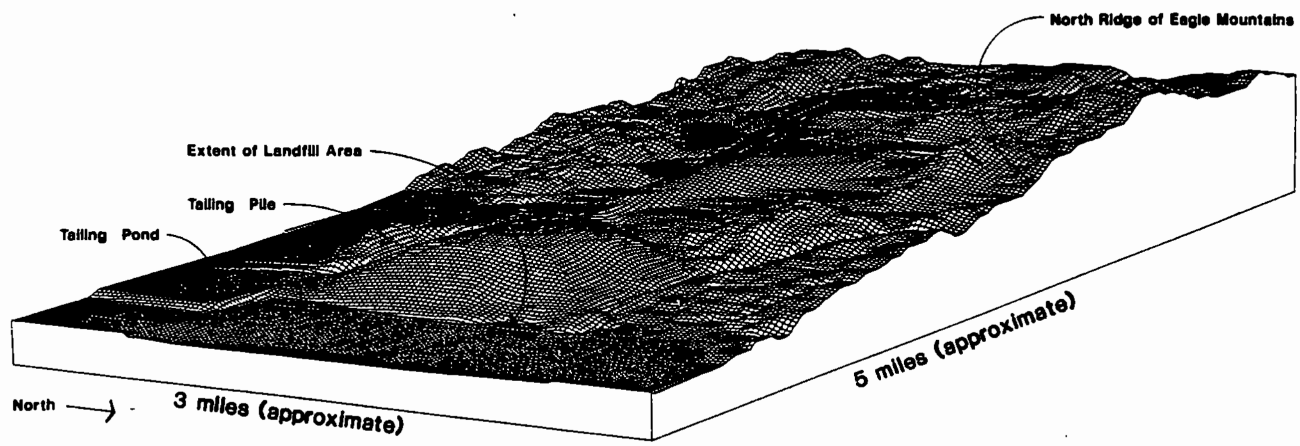
California Desert Conservation Area. Although all four multiple use classes occur in the project vicinity, the lands immediately adjacent to the project area are designated as Class I (Intensive), the highest and best use of which is determined to be "to provide for concentrated use of lands and resources to meet human needs." The project area itself is private land and is therefore not classified by the BLM. The adjacent areas will continue to support very low to moderate user densities and recreation values will remain at the same existing levels for hiking, backpacking, hunting, camping, four-wheel driving for pleasure, wilderness use, and nature study. Sight-seeing from some locations will continue to be impacted by off-site views of the project area, but at less than current levels.

Joshua Tree National Monument. The project area is not within the boundaries of JTNM and will have no direct impact on its recreation values, uses, or opportunities for camping, hiking, backpacking, photography, wilderness use, or nature study. The project area is not visible from Pinto Basin or from roads within JTNM (see Figure 91). As the landfill nears completion (Figure 96), a portion of the landfill would exceed the elevation of the northern ridgeline of the Eagle Mountains and would be visible from the eastern portion of Pinto Basin and could detract from the wilderness characteristics of the area. From points further to the north in the Pinto Mountains, binoculars are required to pick out the radio tower on this ridgeline, so although activities higher than the ridgeline could possibly be seen, they would not be detectable to most JTNM visitors at this distance.

The proposed action will not result in a loss of existing recreation opportunities, displacement of recreation uses, or a degradation of recreation values. Therefore, no direct impacts are associated with this alternative. The indirect visual impact to off-site recreation areas would



EXISTING CONDITIONS



PROJECT COMPLETION

FIGURE 96 VIEW FROM THE NORTHEAST (COXCOMB MOUNTAINS), EXISTING AND PROJECT COMPLETION CONDITIONS

RECON

be insignificant. The features included as part of the project design would eliminate or minimize project views from Pinto Basin, eliminate or significantly reduce project views from the Coxcomb Mountains, and lessen the impact on views from the Eagle Mountains.

Mitigation

No mitigation is required.

Significance After Mitigation

No significant impact is identified with the proposed action.

b. Reduced Landfill Operations Alternative

Impact

This reduced scale of operations alternative would have a lesser impact than the proposed action. The resulting decrease in height of the landfill would render it virtually undetected from most adjacent recreational use areas. No direct impacts are associated with this alternative. Indirect visual impact to recreation areas would be insignificant.

Mitigation

No mitigation is required.

Significance After Mitigation

No significant impact is identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

A reduction in truck traffic to the site would have effects similar to the proposed action. No direct impacts are associated with this alternative and indirect visual impact to recreation areas would be insignificant.

Mitigation

No mitigation is required.

Significance After Mitigation

No significant impact is identified with this alternative.

d. No Action Alternative

Impact

This alternative would result in a continuation of insignificant impacts on recreation.

Mitigation

No mitigation is required.

Significance After Mitigation

The current level of impact is not considered significant.

7. Wilderness

Assumptions and Assessment Guidelines. The evaluation of the project's impact on WSAs is based on the assumption that lands currently under review for wilderness are required by federal mandate to be managed in a manner that does not impair their suitability for wilderness designation. Therefore, impairment or degradation of a Wilderness Study Area's size; naturalness; outstanding opportunities for solitude or a primitive and unconfined type of recreation; or ecological, geological, or other features of scientific, educational, scenic, or historic value would constitute a significant impact.

a. Proposed Action

Impact

The landfill construction and operations, as allowed by the land exchange, rail and road right-of-way grants, and plan amendment will have no direct impact on wilderness resources: there are no designated WSAs within the project boundaries, there will not be a reduction in off-site wilderness areas, nor will there be any immediate physical effects to these off-site areas.

There will be no reduction in size, naturalness, outstanding opportunities for solitude or for primitive and unconfined recreation, or ecological, geological, or other features of scientific, educational, or historic value of WSAs. There will be no surface disturbance or visible impact on WSAs themselves. The landfill will not degrade or impair the wilderness values of adjacent

WSAs to constrain the Secretary of Interior's recommendation with respect to the areas' suitability or nonsuitability for preservation as wilderness.

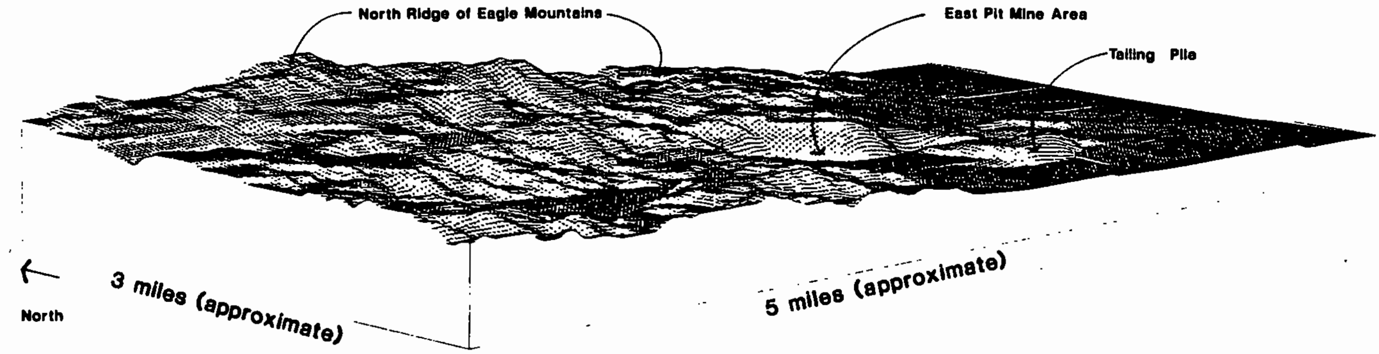
Indirect impacts will be limited to those resulting from increased activity levels visible from WSAs and any associated noise, night lighting, or windblown debris. Noise, night lighting, and windblown debris have been discussed in previous sections. Upon completion, the landfill will have a lesser visual impact on wilderness values than the existing conditions because of the reduction of visual contrast.

Three factors related to the landfill design further lessen impacts to wilderness scenic values. These are the location of the area, the design of the landfill, and the visual contrast reduction. The location of the landfill area at the base of and tucked back into the Eagle Mountains decreases or eliminates its visibility from the Coxcomb and Chuckwalla mountains and Pinto Basin. The design of the form and shape of the landfill would decrease its visibility and dominance. Other mitigation methods described under Visual would reduce the impacts on the wilderness scenic values.

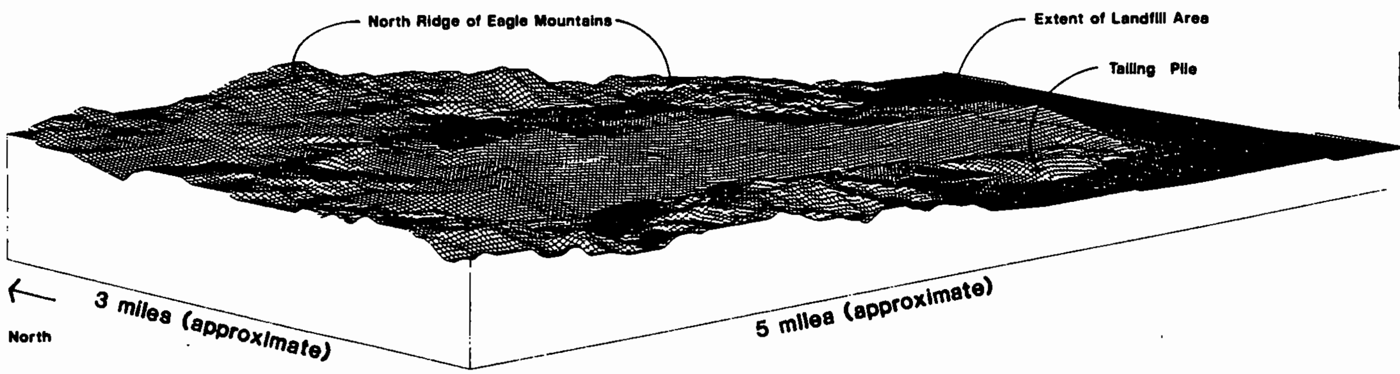
The following discussions on the four WSAs in the project vicinity describe in detail how the off-site views from these areas would be affected by the proposed action.

Coxcomb Mountains WSA (CDCA-328). Landfill operations will be visible in the background from points in these mountains, but from eight miles distance, they will be subordinate to other elements within the viewshed. Once completed, the landfill will be difficult to distinguish from the surrounding Eagle Mountains. Figure 96 illustrates the appearance of the project site as it appears now and how it will appear upon the project completion from the Coxcombs. Areas in the central and northern portions of the Coxcombs which are most frequently used for recreation do not have views of the project area and will not be visually impacted. The distance precludes other impacts on other wilderness values.

Eagle Mountains WSA (CDCA-334). The project area will continue to be highly visible from many areas within the Eagle Mountains but not from the most commonly visited areas. Figure 97 illustrates the appearance of the project site as it is now and as it will appear upon project completion from a ridgeline point in the Eagle Mountains. Figure 92 shows cross sections from the Eagle Mountains through the project site. Figure 90 shows the location of the cross section. Short-term visual impacts will be greater than current impacts because of the increase in activities and traffic that would be visible in the foreground zone. Long-term visual impacts will be less significant after implementing the visual contrast mitigation measures. The solitude of interior canyons, diversity of terrain, and relationship to Joshua Tree National Monument will continue to offer outstanding opportunities for primitive and unconfined types of wilderness recreation.



EXISTING CONDITIONS



PROJECT COMPLETION

FIGURE 97. VIEW FROM THE SOUTHEAST (EAGLE MOUNTAIN), EXISTING AND PROJECT COMPLETION CONDITIONS

RECON

Pinto Basin WSA (CDCA-334A). The project area is not visible from Pinto Basin (see Figure 91). As the landfill nears completion (see Figure 96), a portion of the landfill would exceed the elevation of the ridgelines of the Eagle Mountains and would be visible from the eastern portion of Pinto Basin and could detract somewhat from the scenic characteristics of the area. Other opportunities such as camping, backpacking, nature study, and wilderness experience will not be impacted.

Chuckwalla Mountains WSA (CDCA-348). The views of the project area from these mountains is obscured by distance and topography. Impacts to wilderness resources will be insignificant.

Project features discussed above under views from KOPs would eliminate or minimize project views from Pinto Basin as well; eliminate or significantly reduce project views from the Coxcomb Mountains; and lessen the impact of views from the Eagle Mountains. These indirect visual impacts on wilderness resources are not considered significant. The significance of impact after implementation of the design features will not impair the suitability of adjacent WSAs for preservation as wilderness. No other impacts to wilderness values are associated with this alternative.

Mitigation

Project design features such as the reduction of visual contrast, project phasing, and truck traffic routing would significantly reduce impacts to wilderness resources. No additional mitigation is required.

Significance After Mitigation

No significant impact is identified with the proposed action.

b. Reduced Landfill Operations Alternative

Impact

This alternative would have a lesser impact than the proposed action. There would be only an incremental reduction of impact on views from the Coxcomb Mountains because, from a distance of eight miles, the decrease in height would not be significantly noticeable. The views from the Eagle Mountains would be affected slightly more by this alternative because the reduction in size would be more apparent to closer viewers. The resulting decrease in height would render the landfill virtually undetected from most of Pinto Basin.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant wilderness resources impact is identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would only affect the Eagle Mountain areas that have foreground views of the railroad and Eagle Mountain Road. The truck traffic would decrease, but there would not be a significant reduction of impact on the wilderness recreation areas.

Mitigation

Mitigation is the same as for the proposed action.

Significance After Mitigation

No significant wilderness resources impact is identified with this alternative.

d. No Action Alternative

Impact

The No Action alternative would result in a continuation of the current visual impacts on the Eagle Mountains (low to high impact), Coxcomb Mountains (medium-low impact), and Joshua Tree National Monument (low impact). Off-site views from the wilderness areas to the open pit mine would not change.

Mitigation

No mitigation is identified.

Significance After Mitigation

The current level of impact is not considered significant.

K. Utilities and Services

1. Water and Sewer

Assumptions and Assessment Guidelines. Impacts to water and sewer would be considered significant if existing facilities could not serve adequately the needs of the proposed landfill operations.

a. Proposed Action

Impact

The total water consumption due to the proposed landfill activities, including dust control, would amount to approximately 1,972 acre-feet per year as discussed in the Water Quality and Use section of this draft EIS/EIR. Existing wells in the Chuckwalla Valley will provide this water. Using the total groundwater reserve estimate of 6 million acre-feet based on U.S. Geological Survey calculations of basin water resources discussed in the Water Quality and Use section, there appears to be recoverable water reserves in the project area for a period of approximately 500 years. The project's effect on the future groundwater supply is not considered a significant impact. The cumulative impact of this water consumption on the regional water basin is discussed in the Water Quality and Use and Cumulative sections of this draft EIS/EIR.

Indirect impacts on water consumption would occur due to the increased population at the Eagle Mountain townsite. As noted in the project description, the landfill project is expected to create approximately 163 jobs. With an average household size of 3.6 persons (SCAG 1980) and assuming each job would represent a household, the 163 jobs would translate to a maximum population increase of approximately 587 persons. The SCAG (1980) census information is considered more representative of an actual maximum population at Eagle Mountain since the 1989 census update by Riverside County reflects an average household size based on the retirement community of Lake Tamarisk. The population of Eagle Mountain and the neighborhood communities would also increase somewhat as commercial development is expanded and renovated in the area.

The water and sewer infrastructure for the past Kaiser mining activities at Eagle Mountain would be available with adequate capacity to serve the larger population which would result from implementation of the landfill project. Water consumption within the townsite of Eagle Mountain would increase approximately 145,500 gallons per day (based on a consumption rate of 240 gallons per person according to the Coachella Water District estimate of one acre-foot per year per family). Potable water is presently provided by tanker truck or in bottles. Additional water truck trips would be necessary.

This is not likely to be a long-term solution for potable water use in the townsite. When a specific plan is developed for the townsite, some sort of acceptable defluoridation scheme will need to be part of the overall facility plan. The environmental documentation associated with that specific plan would discuss in greater detail the use of potable water in the town of Eagle Mountain.

Direct and indirect water impacts due to the proposed project would be considered below a level of significance.

An increase in sewage generation of approximately 39,000 gallons per day (based on 240 gallons per unit per day) would exceed the permitted discharge; however, the treatment facility's capacity is adequate for such an increase. If and when the facility's discharge exceeds its permitted discharge, an application to request additional discharge would have to be filed with the Lower Colorado River RWQCB to increase the discharge requirements for the plant facility. The RWQCB would review the application and, if appropriate, could approve the additional discharge. It is reasonable to assume that as long as the discharge did not exceed the plant's capacity, such requirements would be increased and not result in significant impacts.

Leachate produced in the landfill may ultimately go to the existing sewage treatment plant. If within parameters that make the leachate nonhazardous, it may be used on unpaved roads for dust control or placed in open-topped containers to evaporate. Alternatively, it will be delivered by truck to existing sewage treatment plant for disposal. If the treatment does not render the effluent nonhazardous, it will be stored on-site in an approved manner as a hazardous waste and periodically disposed of in accordance with applicable regulations.

If there is sufficient floating organics (oil), it will be passed through a commercial oil skimmer for the removal of the offending compounds. Recovered organics will be collected and stored as hazardous waste and disposed of in accordance with applicable regulations at a licensed facility. If high BOD is noted, the leachate will be passed through an aerator to oxygenate the water. This will lower the BOD. These "pretreatment" facilities will be either permanent or portable, the selection of which will be based on the location of the leachate collection, the quantity of leachate, and so on. Details of the pretreatment facilities will be determined during the permitting process. Ultimately, permanent facilities will be used. Therefore, it is anticipated that potential sewer impacts would be below a level of significance.

The railroad and Eagle Mountain Road right-of-way grants, as well as the exchange of public and private lands, will have no impact on water and sewer services.

Mitigation

Mitigation measures would not be required.

Significance After Mitigation

Impacts are considered not significant.

b. Reduced Landfill Operations Alternative

Impact

This alternative would reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the impacts would be similar to the proposed action.

Mitigation

Mitigation measures would not be required.

Significance After Mitigation

Impacts are considered not significant under this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would also reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the impacts would be similar to the proposed action.

Mitigation

Mitigation measures would not be required.

Significance After Mitigation

Impacts are considered not significant under this alternative.

d. No Action Alternative

Impact

The No Action alternative would retain the site in its current state and not create the additional demand for water and sewer services.

Mitigation

No mitigation would be necessary, as no impacts would occur.

Significance After Mitigation

No significant impacts would result.

2. Fire, Police, and Emergency Medical Services

Assumptions and Assessment Guidelines. The proposed action assumes a generation of 163 jobs which translates into a maximum population increase of 587 persons. The proposed action would result in significant impacts to fire and police services if the needs of the area could not be adequately accommodated by existing services.

a. Proposed Action

Impact

The Riverside County Sheriff's office has indicated that they would not anticipate any significant impact on the department's ability to provide service to the area (Doyle, Riverside County Sheriff, 8/23/89).

Based on the preliminary population increase estimate from the landfill project, the Riverside County Fire Department considers the existing fire protection as inadequate. This impact assessment assumes that the RTCF-required improvements will be implemented. Reactivation and full funding of the Eagle Mountain station with Riverside County personnel is currently a condition of approval for the RTCF expansion. Full funding of the Eagle Mountain fire station (two persons, 24 hours per day, seven days per week) would not provide adequate fire protection for the area once the landfill is operating (Regis, Riverside County Fire Department, 5/31/90). Additional improvements to the existing water system in the housing area and to the landfill project site will be required to provide the required fire flows.

The railroad and Eagle Mountain Road right-of-way grants, as well as the exchange of public and private lands, will have no impact on fire, police, or emergency medical services.

Mitigation

Mitigation measures for police service would not be required. However, the sheriff's department has suggested that the design of the project incorporate site and equipment security by either fencing or maintaining private security personnel. The project design will fence the active use areas of the landfill and limit access to the site from existing jeep trails.

The need for additional fire personnel and equipment beyond that currently proposed for the RTCF at Eagle Mountain is anticipated based on the preliminary population estimates for the project (Regis, 5/31/90). Since the population associated with the landfill would be served by the fire staffing requirements of the RTCF, the project would be required to contribute to the funding of the fire improvements. The following mitigation measures would reduce the fire protection impacts to below the level of significance.

1) The applicant shall submit detailed plot plans of each planning area for review/approval.

2) Prior to the issuance of any use and/or building permits, the project proponents shall:

   a) Obtain a written agreement for fire protection services from the Riverside County Fire Department.

   b) Submit a Fire/Life Safety and Emergency Response Plan to the fire department for review/approval.

   c) Install water mains and fire hydrants that provide the required fire flows pursuant to an improvement plan approved by the fire department.

3) Project proponents shall participate in the fire protection impact mitigation program as adopted by the Riverside County Board of Supervisors.

4) Clearance from the fire department shall be obtained prior to the use and/or occupancy of any existing dwelling units, buildings, or structures located within the Eagle Mountain community and/or the proposed boundaries of the project.

Significance After Mitigation

Police protection impacts are considered insignificant. The mitigation measures listed above will reduce fire protection impacts below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

A reduction in the landfill configuration would not reduce the number of employees needed to operate the landfill. Thus, utility/services demands would be similar to those associated with the proposed action.

Mitigation

To reduce fire protection impacts, the same mitigation measures are recommended as for the proposed action.

Significance After Mitigation

Police protection impacts are considered insignificant. The mitigation measures listed for the proposed action would reduce fire protection impacts to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the impacts would be similar to the proposed action.

Mitigation

To reduce fire protection impacts, the same mitigation measures are recommended as for the proposed action.

Significance After Mitigation

Police protection impacts are not considered significant. The mitigation measures listed for the proposed action would reduce fire protection impacts to below a level of significance.

d. No Action Alternative

Impact

The No Action alternative would retain the site in its current state and not create the additional impacts.

Mitigation

No mitigation would be necessary.

Significance After Mitigation

No significant impacts would occur.

3. Utilities

Assumptions and Assessment Guidelines. The following assessment of utilities service impacts is based on a population increase of 587 persons. The proposed action would result in significant impacts to utilities if the needs of the area could not be adequately accommodated by existing services.

a. Proposed Action

Impact

Significant impacts relating to the demand for electricity, natural gas, and telephone service are not anticipated. Responses to the Notice of Preparation from Southern California Edison (8/31/89) and Southern California Gas Company (8/17/89) indicate that both utilities would be able to serve the project and the town. Telephone and cable television service infrastructure exists at Eagle Mountain and the surrounding communities and significant impacts would not be expected.

The railroad and Eagle Mountain Road right-of-way grants, as well as the exchange of public and private lands, will have no impact on utilities.

Mitigation

Mitigation measures beyond the possible extension of electrical, gas, and telephone lines to project buildings and any new residences at Eagle Mountain, Lake Tamarisk, and Desert Center would not be necessary.

Significance After Mitigation

No significant impact to utilities are anticipated.

b. Reduced Landfill Operations Alternative

Impact

This alternative would reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the demand for utilities would be similar to the proposed action.

Mitigation

No mitigation would be required.

Significance After Mitigation

No significant impacts were identified with this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the demand for utilities would be similar to the proposed action.

Mitigation

No mitigation would be required.

Significance After Mitigation

No significant impacts were identified with this alternative.

d. No Action Alternative

Impact

The No Action alternative would retain the site in its current state and not create the additional impacts.

Mitigation

No mitigation would be required.

Significance After Mitigation

No significant impacts would result.

4. Community Facilities

Assumptions and Assessment Guidelines. The following assessment of impacts on community facilities is based on a population increase of 587 persons. The proposed action would result in significant impacts to community facilities if the needs of the area could not be adequately accommodated by existing services.

a. Proposed Action

Impacts

The population increase from the proposed action would result in additional users of the existing library and recreation facilities at Lake Tamarisk. These facilities could adequately accommodate the new use and significant impacts would not be anticipated. The branch library is currently underutilized and has sufficient space to provide service to a much larger population.

As with the library, the schools at Eagle Mountain are substantially underutilized. Both the elementary school and the middle school are not being used, and the high school currently has 93 students attending grades K-8. With such a large available student capacity, adverse impacts to the Desert Center Unified School District would not be anticipated.

Since the proposed action is a landfill operation which would be able to accommodate solid waste from the surrounding communities, additional impacts to the County sanitary landfill on Kaiser Road would be eliminated.

The railroad and Eagle Mountain Road right-of-way grants, as well as the exchange of public and private lands, will have no impact on community facilities.

Mitigation

No mitigation measures would be required.

Significance After Mitigation

No significant impacts would result from this alternative.

b. Reduced Landfill Operations Alternative

Impact

A reduction in the landfill operations would not reduce the number of employees needed to operate the landfill. Thus, demand on the schools, libraries, and recreation facilities would be similar to that associated with the proposed action.

Mitigation

No mitigation measures would be required.

Significance After Mitigation

No significant impacts would result from this alternative.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would reduce the daily capacity of the landfill to 16,000 tons per day. Since such a reduction would not likely decrease the number of employees needed to operate the landfill, the demand for library, recreation, and school facilities would be similar to the proposed action. Since this alternative would not accommodate solid waste carried by trucks, use of the existing County landfill would continue.

Mitigation

No mitigation measures would be required.

Significance After Mitigation

No significant impacts would result from this alternative.

d. No Action Alternative

Impact

The No Action alternative would retain the site in its current state and not create the additional impacts.

Mitigation

No mitigation measures would be required.

Significance After Mitigation

No significant impacts would result from this alternative.

L. Noise

Potential noise impacts may be separated into five categories: (1) the noise impact of the sorting and loading facilities, (2) the noise impact due to transport of wastes by rail, (3) the noise impact due to project-generated street traffic (waste transport via trucks and incidental vehicle traffic), (4) the noise impact of the proposed landfill operations, and (5) the temporary on-site noise impact due to construction noise.

The proposed BLM/Kaiser land exchange involves BLM lands in or near the proposed landfill site subject to noise impacts from all but the first category of noise impacts mentioned above. These potential impacts are discussed below and are considered below a level of significance. The Kaiser lands to be traded to BLM are located along the Chuckwalla Bench adjacent to the Eagle Mountain rail line. The only sensitive noise receptor in these lands is the state and federally threatened desert tortoise. The potential noise impacts associated with this non-human noise receptor are discussed briefly in the biology section of this draft EIS/EIR and more completely in Appendix F.

1. Transfer Stations

The processing and transfer stations which would send solid waste to the Eagle Mountain landfill are not permitted by any actions covered by this draft EIS/EIR. Since they would be related to this project, however, their operation and potential noise effects are considered possible indirect impacts of the project.

Assumptions and Assessment Guidelines. For purposes of this analysis, three typical locations for processing and transfer stations were reviewed for possible noise impacts. These three locations were identified in an earlier proposal for solid waste service to the San Gabriel Valley. There are no specific proposals to actually construct processing and transfer stations at these locations, but they are typical of sites where such facilities would be located. The three possible sites are in the eastern half of San Gabriel Valley. Two of the sites are south of I-10 and north of State Highway 60. For reference, they have been named the Valley Boulevard site and the Cypress Street site. The third site, herein referred to as the La Verne site, is located north of I-10. Appendix H contains more descriptive information regarding these locations.

In community noise assessment for this draft EIS/EIR, changes in noise levels greater than 3 dBA will be identified as significant. Noise level changes in the range of 1 to 3 dBA will be considered noticeable, but not significant. Noise level increases below 1 dBA will not be considered significant. In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are that there must be some sort of noise-sensitive land uses (such as residential areas) near the noise source that will be impacted and that the 65 CNEL noise contour must extend far enough from the noise source to impact any residential areas.

a. Proposed Action

Impacts

The pieces of equipment that would be operating at the sorting and loading stations include scales, front-end loaders, compactors, container-top handlers, shuttle trucks, conveyors, and sweepers.

The Valley Boulevard site is surrounded by industrial developments and several undeveloped parcels. The existing zone for the Valley Boulevard site is M, Industrial. These land uses are not highly sensitive to noise. Therefore, noise generated from the proposed sorting and loading operations at the Valley Boulevard site should not adversely affect surrounding land uses.

The existing zoning for the Cypress Street site and surrounding parcels is M-2, Manufacturing. The Cypress Street site includes four acres of Southern Pacific property (a rail yard) and land in an adjacent parcel that is being developed as an industrial site. These surrounding land uses are not considered noise-sensitive, and therefore, noise generated from the proposed sorting and loading operations at the Cypress Street site should not constitute a significant or adverse noise impact.

The La Verne site is bordered on the east and west by an industrial park. Brackett Field occurs south of the site, and north of I-10. To the north, opposite the Southern Pacific main line, are residential areas. The industrial areas east and west of the La Verne site and Brackett Field to the south are not sensitive to noise. Noise generated from the proposed sorting and loading operations would therefore not adversely impact land uses to the east, west, and south of the La Verne site. However, the residential areas north of the La Verne site are considered noise-sensitive and, as such, might experience adverse noise levels as a result of sorting and loading operations. The occurrence and extent of the impact, if any, would be dependent on the existing noise levels at this location due to the current train operations in the area and the precise design of the processing and transfer station if it were to be constructed at this location.

Mitigation

For the three sample locations considered, no adverse noise impacts would be expected at two sites: the Valley Boulevard and Cypress Street sites. Residential areas north of the La Verne site might be adversely affected by noise from a processing and transfer station. A more detailed study of the loading facilities and operations is required to identify the specific noise impact on and subsequent mitigation for these residential areas. Typical noise mitigation measures which would be expected include (1) the selection of specific equipment items for lower noise emissions; (2) a site design which isolates noise-producing activities in an area farthest from residential receptors, with structures or other noise barriers placed in between; and (3) restrictions on operating hours. Details of these mitigation measures would have to be determined in a site-specific noise analysis.

Performance of a site-specific noise analysis for any new processing and transfer stations is reasonably assured since the construction of a station would be subject to a local conditional use permit and its own solid waste facilities permit. Both of these discretionary actions require environmental review. Thus, even though the construction of the processing and transfer stations is not covered by this draft EIS/EIR, the regulatory mechanism exists to more clearly identify the potential impacts and mitigation measures from these noise sources.

Significance After Mitigation

All new transfer stations will be subject to environmental review once a site is proposed. A noise analysis will be necessary and appropriate mitigation measures should reduce any significant noise impacts below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

The effects of this alternative would be the same as those for the proposed action.

Mitigation

The mitigation would be the same as that for the proposed action.

Significance After Mitigation

See Proposed Action above.

c. Proposed Action with Rail Access Only Alternative

Impact

Under this alternative, noise impacts as a result of sorting and loading operations would be the same as those identified for the proposed action.

Mitigation

The mitigation would be the same as that for the proposed action.

Significance After Mitigation

See Proposed Action above.

d. No Action Alternative

Impact

Under the No Action alternative, all noise impacts identified with the proposed action would be avoided. As conventional landfills closer to the metropolitan areas become filled and closed, however, it is expected that more processing and transfer stations will be constructed to support transport of solid waste to more distant landfills.. Thus, the effects of transfer stations would occur at some time in the future with or without the Eagle Mountain project.

Mitigation

The mitigation would be the same as that for the proposed action.

Significance After Mitigation

See Proposed Action above.

2. Waste Transport Via Rail

Assumptions and Assessment Guidelines. Existing noise levels close to the Southern Pacific rail line already exceed maximum noise levels for noise-sensitive land uses (i.e., 60 and 65 dBA CNEL). In community noise assessment for this draft EIS/EIR, changes in noise levels greater than 3 dBA will be identified as significant. Noise level changes in the range of 1 to 3 dBA will be considered noticeable, but not significant. Noise level increases below 1 dBA will not be considered significant. In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are that (1) there must be some sort of noise-sensitive land uses (such as residential areas) near the noise source that will be impacted and (2) the 65 CNEL noise contour must extend far enough from the noise source to impact any residential areas.

The Eagle Mountain railroad is currently not in use and existing noise levels along the rail corridor are generally low. Noise levels along the Eagle Mountain rail line in excess of 65 CNEL would be considered a significant impact.

a. Proposed Action

Impact

Project rail transport would be along the Southern Pacific main line from San Gabriel Valley loading stations to Ferrum Junction in Riverside County. At Ferrum Junction, the rail transport would be switched to a private line, the Eagle Mountain railroad, that runs directly to the Eagle Mountain disposal site (approximately 52 miles from Ferrum Junction). During the first phase of the project, a single train (two train trips) would serve the project site via the existing rail line which terminates south of the western portion of the East Pit. When demand justifies more than a single train per day, a new rail spur would be built off the Eagle Mountain rail line southeast of the existing landing strip, terminating in the Phase II container handling yard. The new spur would be approximately two miles long and would carry traffic to the eastern portion of the project area, away from the town of Eagle Mountain. In Phase II, the proposed Eagle Mountain landfill expects to utilize a maximum of six trains per day. The six trains would operate in each direction, for a total of 12 train trips or pass-bys per day. Each train would have an average of 14 cars. An average speed of 50 MPH is assumed for this study.

For the Southern Pacific rail line, the addition of the project-generated train traffic to the existing train traffic would slightly increase (+0.7 dB) noise levels along the rail corridor. This noise increase due to the increase in train traffic is shown below in Table 43.

TABLE 43
NOISE LEVEL INCREASE ON SOUTHERN PACIFIC RAIL LINE DUE TO PROJECT-GENERATED TRAIN TRAFFIC

Distance to CNEL Level	Existing CNEL Level	Project CNEL Level	Existing + Project CNEL Level	Noise Level Increase (dB)
100 ft.	74	66.6	74.7	+0.7

As can be seen from Table 43, the noise level increase of 0.7 dB that would be experienced by residential areas 100 feet from the Southern Pacific rail line is not considered significant.

The Eagle Mountain railroad is currently not in use. Existing noise levels along the rail corridor are generally low. To determine the future noise levels due to the Eagle Mountain rail line that would be utilized for the project between Ferrum Junction and Eagle Mountain, the Wyle train noise model was used. The proposed railroad operations data were used to determine train noise levels at various distances. The noise levels anticipated to be generated by the use of the Eagle Mountain rail line are shown below in Table 44.

TABLE 44
PROPOSED EAGLE MOUNTAIN RAILROAD NOISE LEVELS

Distance (feet)	100	200	300	400	500	700	1,000	2,000	5,000
CNEL (dBA)	66.6	62.8	59.6	57.3	55.6	53.0	50.2	44.8	37.8

Land uses along the Eagle Mountain rail corridor that lie within 100 feet of the rail line would experience noise levels in excess of 65 CNEL due to full operation of the project-generated train traffic (12 train trips per day). The residential noise threshold contours of 65 and 60 dBA CNEL would extend roughly 150 feet and 300 feet, respectively, from the edge of the Eagle Mountain railroad. In the vicinity of the Eagle Mountain townsite, the full level of train activity would be associated with the Phase II location of the container handling yard, at the eastern end of the East Pit. The new rail alignment proposed to serve this area is located approximately 1.5 miles from the nearest residential or school uses. Thus, the noise levels from the train operations in this area would not cause a significant impact.

The existing return-to-custody facility is approximately 150 feet from the Eagle Mountain rail line at its closest point. Enrollees of this facility would be exposed to potentially significant train noise levels if the full train operation of the project were to occur along this segment of track. Near the location of the RTCF, however, only the Phase I level of operations would occur. At this level of activity (one train, or two train trips, per day) the projected CNEL at 150 feet would be approximately 61 dBA. This would not represent a significant noise impact.

Mitigation

Noise levels resulting from the Southern Pacific railroad presently exceed the 60 and 65 dBA CNEL maximum considered acceptable for single- and multiple-family residential land use. The proposed action would generate additional train trips and a resulting noise increase of 0.7 decibel along the Southern Pacific rail corridor. This slight increase is not considered significant and does not require mitigation.

A specific plan covering the Eagle Mountain townsite is currently being prepared. To provide compatibility between the noise levels from the rail operations and land uses to be established in the townsite specific plan, buffering distances of 150 feet (distance to 65 CNEL) and 300 feet (distance to 60 CNEL) should be provided between the rail line and multiple-family housing and single-family housing, respectively. Given the relationship between the existing uses in the townsite and the new rail spur which is proposed for the Phase II access to the Eagle Mountain landfill, design of these buffering distances is feasible. Implementation of this measure would be accomplished through the County Planning Department on the Eagle Mountain townsite specific plan.

Significance After Mitigation

Noise impacts along the Southern Pacific and Eagle Mountain rail corridor are not significant.

b. Reduced Landfill Operations Alternative

Impact

The effects of this alternative would be the same as those for the proposed action.

Mitigation

Mitigation is the same as for the proposed action. No additional mitigation is required.

Significance After Mitigation

Noise impacts along the Southern Pacific and Eagle Mountain rail corridor are not significant.

c. Proposed Action with Rail Access Only Alternative

Impact

Under this alternative, noise impacts would be the same as those identified for the proposed action.

Mitigation

Mitigation is the same as for the proposed action. No additional mitigation is required.

Significance After Mitigation

Noise impacts along the Southern Pacific and Eagle Mountain rail corridor are not significant.

d. No Action Alternative

Impact

Under the No Action alternative, all noise impacts identified with the proposed action would be avoided.

Mitigation

None is required.

Significance After Mitigation

Noise impacts along the Southern Pacific and Eagle Mountain rail corridor are not significant.

3. Project-related Vehicle Traffic

Assumptions and Assessment Guidelines. Future traffic noise levels were determined by modeling the subject roadways for the traffic characteristics defined in the traffic study prepared for the proposed action by DKS Associates. The project-generated traffic would include an addition of 400 truck trips per day along Eagle Mountain Road and employee and incidental traffic amounting to about 500 trips per day along Kaiser Road. Those roadways that might carry project-generated traffic were modeled using the FHWA traffic noise model (FHWA 1978).

In community noise assessment for this draft EIS/EIR, changes in noise levels greater than 3 dBA will be identified as significant. Noise level changes in the range of 1 to 3 dBA will be considered noticeable, but not significant. Noise level increases below 1 dBA will not be considered significant. In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are that (a) there must be some sort of noise-sensitive land uses (such as residential areas) along the roadway that will be impacted and (b) the ultimate traffic volume must be great enough to have a significant impact, which means that the 65 CNEL noise contour must extend far enough from the roadway centerline to impact any residential areas.

a. Proposed Action

Impact

Future (year 1995) traffic/noise conditions without the proposed action and future traffic/noise conditions with the proposed action were calculated to provide comparison and determination of project-generated impacts. The distances to the CNEL contours for future with and without project scenarios are given in Tables 45 and 46. These distances are measured from the roadway centerline to the contour value shown. These projections do not take into account the effects of topography or intervening barriers that might alter ambient noise levels and, as such, represent a worst case.

TABLE 45
FUTURE WITHOUT PROJECT ROADWAY NOISE LEVELS

Roadway	Distance to CNEL Contour (Feet) 70 CNEL	65 CNEL	60 CNEL
Eagle Mountain Road			
I-10 eastbound to I-10 westbound	RW	RW	RW
I-10 westbound to Ragsdale Road	RW	RW	RW
North of Ragsdale Road	RW	RW	RW
Kaiser Road			
I-10 westbound to Ragsdale Road	RW	RW	49
Ragsdale Road to Lake Tamarisk Drive	RW	RW	RW
North of Lake Tamarisk Drive	RW	RW	RW
Interstate 10			
Eagle Mountain Road to Kaiser Road	185	399	860

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

TABLE 46
FUTURE WITH PROJECT ROADWAY NOISE LEVELS

Roadway	Distance to CNEL Contour (Feet) 70 CNEL	65 CNEL	60 CNEL
Eagle Mountain Road			
I-10 eastbound to I-10 westbound	RW	RW	RW
I-10 westbound to Ragsdale Road	RW	RW	RW
North of Ragsdale Road	RW	RW	RW
Kaiser Road			
I-10 westbound to Ragsdale Road	RW	RW	49
Ragsdale Road to Lake Tamarisk Drive	RW	RW	RW
North of Lake Tamarisk Drive	RW	RW	RW
Interstate 10			
Eagle Mountain Road to Kaiser Road	194	418	901

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

The calculated noise increase of the future plus project levels over the future without project levels is shown in Table 47.

The results show that there would be some increase in roadway noise levels due to the project. The roadway with the greatest increase in noise level is Eagle Mountain Road north of Ragsdale Road, with an increase of 11.9 dBA. The other links along Eagle Mountain Road from I-10 to Ragsdale Road will also have noise increases of 9.5 to 10 dB. While these increases are large relative to the existing noise levels in the area, they are not considered significant because the resulting CNEL values are well below the 60 dBA criteria for most sensitive land uses. All other roadways would experience increases in noise levels of less than 1 dB.

Scattered residential areas occur along Kaiser Road as near as 100 feet from the roadway centerline. Residential areas also occur roughly 200 feet from the roadway centerline of I-10. Table 48 shows the noise levels that would be experienced by these worst-case residential areas.

Residential areas located adjacent to Eagle Mountain and Kaiser Roads would not be exposed to significant noise levels in excess of 65 CNEL. Observed residential uses at 200 feet from I-10 would be exposed to CNELs greater than 65; however, existing noise levels already exceeded 65 CNEL. This is not considered a significant impact. Some undeveloped areas designated as residential that are adjacent to roadways that will carry project-related traffic may have homes built on them in the future. If these homes are planned within the roadway 65 CNEL contour line, mitigation measures may be required. Residences close to I-10 may experience CNELs above 65 dBA where existing noise levels already exceed 65 CNEL.

Over the life of the project, it is possible that an interruption of rail service might occur as a result of an earthquake, other acts of God, or rail strike. In these cases, it is anticipated that the inability to deliver refuse by rail would be covered by trucks until rail service can be restored. It is expected that such occurrences would be infrequent and of short duration; therefore, the noise impacts would not be significant.

Mitigation

In order to ensure that the project-related truck traffic does not exacerbate the impacts to I-10, all truck traffic will be required to use the Eagle Mountain Road interchange and access to the project site. This will be included as a requirement in the landfill specific plan. No other mitigation related to vehicle traffic should be necessary.

Significance After Mitigation

The mitigation stated above reduces traffic noise related to the project to below a level of significance.

TABLE 47
INCREASE IN NOISE LEVELS DUE TO PROJECT TRAFFIC

Roadway	CNEL Noise Levels at 100 Feet Future w/o Project CNEL	Future With Project CNEL	Increase Due to Project (dB)
Eagle Mountain Road			
I-10 eastbound to I-10 westbound	38.7	48.2	9.5
I-10 westbound to Ragsdale Road	41.0	51.0	10.0
North of Ragsdale Road	39.0	50.9	11.9
Kaiser Road			
I-10 westbound to Ragsdale Road	55.4	55.4	0.0
Ragsdale Road to Lake Tamarisk Drive	48.2	48.7	0.5
North of Lake Tamarisk Drive	46.6	47.3	0.7
Interstate 10			
Eagle Mountain Road to Kaiser Road	74.0	74.3	0.3

TABLE 48
NOISE LEVELS AT WORST CASE RESIDENTIAL AREAS
100 FEET FROM ROADWAY CENTERLINE

Roadway	CNEL at 100 feet	CNEL at 200 feet
Eagle Mountain Road		
I-10 eastbound to I-10 westbound	48.2	--
I-10 westbound to Ragsdale Road	51.0	--
North of Ragsdale Road	50.9	--
Kaiser Road		
I-10 westbound to Ragsdale Road	55.4	--
Ragsdale Road to Lake Tamarisk Drive	48.7	--
North of Lake Tamarisk Drive	47.3	--
Interstate 10		
Eagle Mountain Road to Kaiser Road	--	69.8

b. Reduced Landfill Operations Alternative

Impact

The effects of this alternative would be the same as those for the proposed action.

Mitigation

The mitigation required for this alternative is the same as that of the proposed action.

Significance After Mitigation

The mitigation stated above reduces traffic noise related to the project to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would eliminate all refuse hauling by truck, thereby reducing traffic volumes and resultant noise levels on both a regional and local basis.

Mitigation

No mitigation is required.

Significance After Mitigation

All significant impacts due to truck noise would be eliminated with this alternative.

d. No Action Alternative

Impact

Under the No Action alternative, all noise impacts identified with the proposed action would be avoided.

Mitigation

No mitigation is required.

Significance After Mitigation

All impacts due to truck noise would be eliminated with this alternative.

4. On-site Landfill Operations

Assumptions and Assessment Guidelines. In community noise assessment for this draft EIS/EIR, changes in noise levels greater than 3 dBA will be identified as significant. Noise level changes in the range of 1 to 3 dBA will be considered noticeable, but not significant. Noise level increases below 1 dBA will not be considered significant. In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are that (a) there must be some sort of noise-sensitive land uses (such as residential areas) near the noise source that will be impacted and (b) the 65 CNEL noise contour must extend far enough from the noise source to impact any residential areas.

a. Proposed Action

Impact

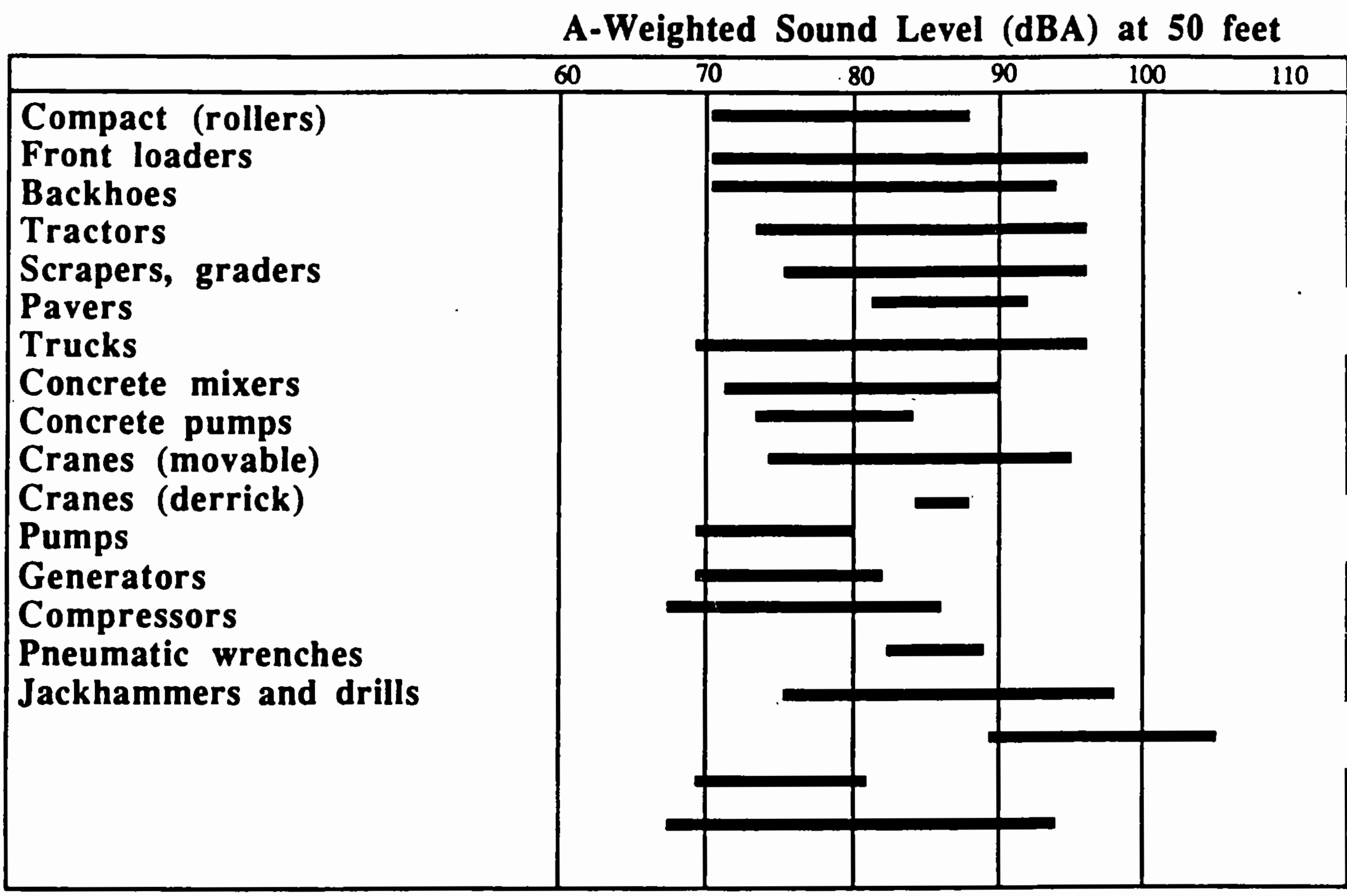
On-site equipment noise will be generated by a number of operations located in several areas of the landfill. This equipment may be divided into three types including landfill operation, container handling yard, and pug mill equipment. A list of the equipment that may be used at the landfill site was supplied by SCS Engineering. Noise levels for the earth moving equipment to be used were obtained from the Caterpillar Tractor Company (Burgstrom, 2/27/90). The earth-moving equipment made by Caterpillar Tractor Company include D-8N crawler tractors, 826 compactors, a 973 trac-loader, 12G graders, and 988 wheel loaders (Table 49). Noise levels for the remainder of the equipment were obtained from the table of construction equipment noise levels compiled by the Environmental Protection Agency as shown in Figure 98. The equipment noise levels obtained from the EPA table are not necessarily noise levels of the exact equipment that will be used for the project. The EPA table shows the range of noise levels measured for various pieces of equipment of a certain type, and the maximum noise levels of the loudest pieces of equipment measured were used in the calculation. All the equipment noise levels were measured at a distance of 50 feet and are shown below in Table 49. The sound level data represent the peak or maximum sound level. These sound levels occur only occasionally.

In Table 49, the noise levels of all the equipment expected to operate at the landfill pit area, container handling yard, and pug mill were separated. Then, the equipment noise levels operating at each facility were summed up, and the distances to the 75 dBA noise level were found. Although Riverside County does not have a noise ordinance, 75 dBA is a typical L_{max} noise level not to be exceeded at any time. Figure 99 shows the combined 75 dBA noise contour

TABLE 49
ON-SITE EQUIPMENT NOISE LEVELS
FROM THE CATERPILLAR TRACTOR CO. (dBA)

Equipment	Number of Vehicles	Noise Level at at 50 feet (dBA)	Combined Noise Level at 50 Feet (dBA)
<u>Landfill Operation Equipment</u>			
D-8N Crawler Tractor	15	84	95.8
826 Compactor	13	80	91.1
973 Trac-loader	7	87	95.5
12 G Graders	3	83	87.8
988 Wheeled Loader	5	82	89.0
Backhoes	1	94	94.0*
Total Noise Level at 50 Feet			101.0
Distance to 75 dBA L_{max} Noise Level (feet)			993
<u>Container Handling Yard Equipment</u>			
Container Handler	2	96	99.0*
Overhead Crane	4	95	101.0*
Container Handling Vehicle	32	87	102.1
Total Noise Level at 50 Feet			105.6
Distance to 75 dBA L_{max} Noise Level (feet)			1,702
<u>Pugmill Equipment</u>			
Pugmill	1	90	90.0*
Total Noise Level at 50 Feet			90.0
Distance to 75 dBA L_{max} Noise Level (feet)			281

*Noise levels obtained from the EPA table.



Source: "Handbook of Noise Control," by Cyril Harris, 1979.

FIGURE 98. CONSTRUCTION EQUIPMENT NOISE LEVELS

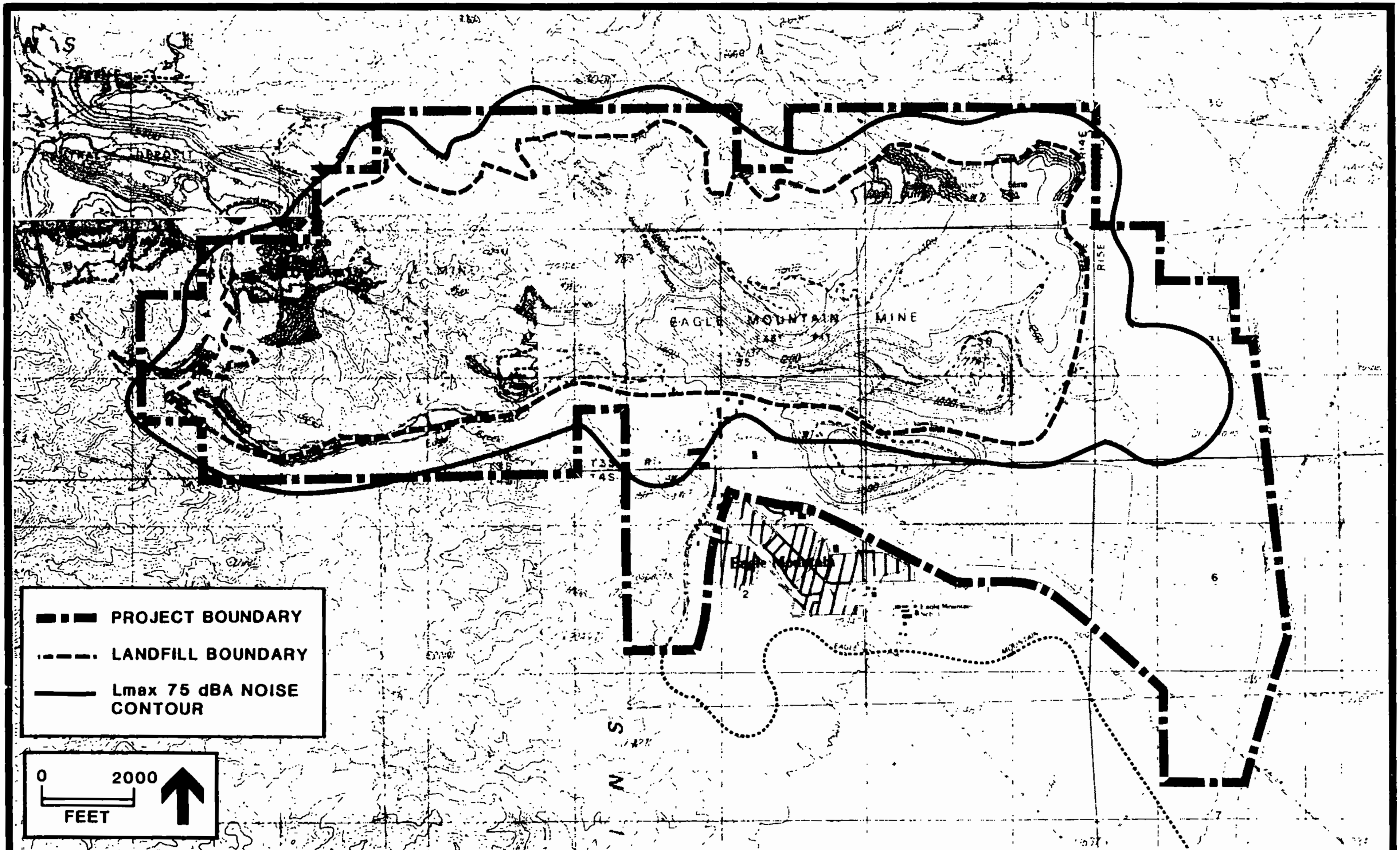


FIGURE 99. 75 dBA Lmax NOISE CONTOUR FOR LANDFILL OPERATIONS

RECON

due to operations at the landfill, container handling yard, and pug mill. It should be noted that the 75 dBA contour for landfill pit operations shown in Figure 99 assumes that the noise source is from a single point placed at the outer edge of the landfill boundary. Under more typical landfill operation conditions, the noise source will be spread throughout the landfill pit area. Site observations show that the closest residential land use to the landfill pit is approximately 2,250 feet away. Extrapolating the cumulative on-site operations noise level to this distance of 2,250 feet gives a noise level of 74 dBA.

This noise level will be audible at 2,250 feet. The EPA table (see Figure 98) shows the maximum noise levels of the loudest pieces of equipment. Also, the earth-moving operations at the project site will mostly take place inside a landfill pit which will provide shielding for the noise. Finally, having the equipment dispersed throughout the landfill will dissipate the noise generation levels. Thus, the noise exposure at the residential area 2,250 feet from the landfill pit is expected to be considerably less than the calculation from the worst-case scenario.

The shortest distance between Joshua Tree National Monument and wilderness areas and the northern project boundary is approximately 8,000 feet. The northernmost ridgeline of the Eagle Mountains separates the project from the Joshua Tree boundaries in this area. From distance alone, the maximum noise levels of the project operations would be reduced to approximately 49 dBA. The additional reduction provided by the major topographic barrier of the Eagle Mountains would make the project operation noise inaudible or indistinct from distant traffic, aircraft, and wind noise. To the northeast from the project site, a relatively clear line of sight exists to the southeastern corner of the wilderness area over a distance of approximately 4.5 miles. At this distance, the maximum noise levels from the project operations would be reduced to approximately 40–45 dBA. It is possible that the project noise may be distinguishable from background noise at this distance, but the noise levels involved are quite low and would not be considered significant.

During the nighttime, the sound from the project operations would more likely be audible to nearby residents above the lower nighttime ambient noise. The only project operations proposed for nighttime hours are the loading and unloading of containers from trains and maintenance activities. The sample model noise ordinance is 5 dB more restrictive during the nighttime hours. Although nighttime noise would more likely be audible, project construction noise levels would still comply with the sample model noise ordinance included in the noise discussion under Affected Environment. Thus, nighttime noise levels would not be considered a significant impact.

Mitigation

Although the on-site operations are not expected to cause a significant noise impact, certain design measures have been incorporated into the project which would reduce the potential for impacts. During the Phase II portion of the project, the equipment noise from this activity would be located approximately 1.5 miles from the nearest residential areas and would be effectively shielded by the existing berms around the fine tailing ponds remaining from the old mining operation. Operations associated with the landfill itself—the spreading and compaction of refuse and the placement of daily cover—would occur only during daylight hours, thus eliminating noise from these activities during the more sensitive nighttime periods.

To avoid the potential noise impact from removal of the cover material from the tailing pile nearest the townsite, measures to minimize noise generation will be taken. These measures include maintenance of the body of the pile to serve as a noise barrier for as long as possible and specific restrictions on operations in this area to avoid noise during the evening and early morning hours. The layout of the operations will be designed to reduce the noise levels on the site.

Significance After Mitigation

The measures included in the project design stated above would reduce noise-related impact to below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

The effects of this alternative would be the same as those for the proposed action. The areas which would be left natural under this alternative are well removed from the residential uses in the townsite of Eagle Mountain and would not provide any benefit from a noise viewpoint.

Mitigation

The mitigation required for this alternative is the same as that of the proposed action.

Significance After Mitigation

The mitigation stated above reduces noise related to this alternative below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would eliminate all refuse hauling by truck. The minor change in on-site operations under this alternative would not affect noise levels in and around the project. Thus, this alternative would not provide any benefits relative to the project as proposed.

Mitigation

No mitigation is required.

Significance After Mitigation

All significant impacts due to operational noise would be eliminated with this alternative.

d. No Action Alternative

Impact

Under the No Action alternative, all noise impacts identified with the proposed action would be avoided.

Mitigation

No mitigation is required.

Significance After Mitigation

All significant impacts due to landfill operational noise would be eliminated with this alternative.

5. Construction Noise

Assumptions and Assessment Guidelines. In community noise assessment for this draft EIS/EIR, changes in noise levels greater than 3 dBA will be identified as significant. Noise level changes in the range of 1 to 3 dBA will be considered noticeable, but not significant. Noise level increases below 1 dBA will not be considered significant. In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are that (a) there must be some sort of noise-sensitive land uses (such as residential areas) near the noise source that will be impacted and (b) the 65 CNEL noise contour must extend far enough from the noise source to impact any residential areas.

a. Proposed Action

Impacts

Construction noise would occur as a result of the development of the proposed action. Construction equipment noise levels are shown in Figure 98. These noise levels are referenced to 50 feet. At 100 feet, these noise levels would be 6 dBA less; at 2,000 feet, 32 dBA less.

The nearest existing residential land uses are situated approximately one-quarter mile southeast of where the nearest construction for the project would occur (the site of the Phase I container handling yard). Therefore, the residential areas of the town of Eagle Mountain would not be adversely impacted by construction noise.

Mitigation

No mitigation measures for construction noise effects are necessary.

Significance After Mitigation

Construction noise is not considered significant.

b. Reduced Landfill Operations Alternative

Impact

The effects of this alternative would be the same as those for the proposed action. The level of construction activity necessary to prepare the site for operations under this alternative would be identical with that for the project as proposed.

Mitigation

No mitigation measures for construction noise effects are necessary.

Significance After Mitigation

Construction noise is not considered significant.

c. Proposed Action with Rail Access Only Alternative

Impact

The construction noise effects under this alternative would be the same as those identified for the proposed action.

Mitigation

No mitigation measures for construction noise effects are necessary.

Significance After Mitigation

Construction noise is not considered significant.

d. No Action Alternative

Impact

Under the No Action alternative, all noise impacts identified with the proposed action would be avoided.

Mitigation

No mitigation measures for construction noise effects are necessary.

Significance After Mitigation

Construction noise is not considered significant.

6. Non-Human Noise-Sensitive Receptors

Assumptions and Assessment Guidelines. In addition to the noise-sensitive human receptors addressed thus far in this discussion, some animal species are sensitive to noise. The effects of sound on animals include hearing impairment, communication masking, nonauditory physiological effects, and behavioral modifications. These effects may lead to loss of habitat and territory; loss of food supply; behavioral changes modifying mating, predation, and migration; and changes in interspecific relationships including predator/prey and competition for food and shelter.

The Coachella Valley fringe-toed lizard, a state and federally threatened wildlife species, occurs along areas of the Southern Pacific rail line. The potential exists for indirect noise impacts to occur to this species due to the increased use of the rail line. These are discussed in the Cumulative Impacts section of this draft EIS/EIR under noise and are considered not significant.

The desert tortoise, a state and federally threatened wildlife species, occurs along portions of the Eagle Mountain railroad and just to the south of the Eagle Mountain townsite. The potential exists for direct noise impacts to occur to this species due to the increased use of the rail line. These are discussed in the biology technical report of this draft EIS/EIR (Appendix F) and are considered not significant.

M. Cultural Resources

Assumptions and Assessment Guidelines. Archaeological sites are nonrenewable historic and scientific resources, and any disturbance or disruption of a site must be considered as potentially serious. For the following analysis of impacts from the proposed project to cultural resources, all sites will be considered significant until they have been properly documented and the Bureau of Land Management, in conjunction with the Office of Historic Preservation, has concurred that the sites are not eligible for the National Register of Historic Places.

Under the National Historic Preservation Act (NHPA) and as directed in the Advisory Council on Historic Preservation regulations, "Protection of Historic Properties," the BLM:

> has the legal responsibility for complying with Section 106. It is the responsibility of the Agency Official to identify and evaluate affected historic properties, assess an undertaking's effect upon them, and afford the Council its comment opportunity (36 CFR 800.1).
>
> In consultation with the State Historic Preservation Officer, the Agency Official shall make a reasonable and good faith effort to identify historic properties that may be affected by the undertaking and gather sufficient information to evaluate the eligibility of the properties for the National Register (36 CFR 800.4).

The project must also comply with the requirements for consideration of cultural resources as cited in CEQA, Public Resources Code Section 21083.2, and Appendix K of the CEQA Guidelines. Under these laws,

> . . . the lead agency shall determine whether the project may have a significant effect on archaeological resources. If the lead agency determines that the project may have a significant effect on unique archaeological resources, the environmental impact report shall address the issue of those resources (Public Resources Code Section 21083.2).

For the following environmental analysis, impacts will also be considered significant if the proposed action or project were to result in encroachment upon a site having special meaning, either religious or cultural, for Native Americans whose traditional territory lies within the area.

1. Eagle Mountain Iron Mine Including BLM Exchange Lands

a. Proposed Action

No cultural resources were located within this area, and the ethnographic study did not identify any Native American concerns. No impacts would result from the proposed project and no mitigation is required.

b. Reduced Landfill Operations Alternative

No cultural resources were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

c. Rail Access Only Alternative

No cultural resources were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

d. No Action Alternative

No cultural resources were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

2. Road and Rail Ways

a. Riv-3798

Proposed Action

Actions related to the railroad which will result from implementation of the proposed project consist of transportation of trash along the rail line, rehabilitation of the railroad, and probable replacement of unstable trestles. No trestles exist near identified cultural resource areas. Rehabilitation of the railroad and required maintenance activities will include track straightening and alignment, ballast regulation, culvert cleanout and repair, vegetation control, and oiler maintenance. The proposed railroad rehabilitation activities will not involve excavations or movement of dirt.

Impact. No remains of site Riv-3798 are in proximity to the railroad, as the construction of the railroad created a 10-meter-deep cut removing the center of the site. The railroad tracks and associated debris resulting from periodic repair (railroad ties, metal stakes, and metal) lie at the base of the 10-meter cut. A 3- to 5-meter-high and 8-meter-wide excavation backdirt pile of pink clay subsoil lies 6 meters southeast and parallel to the southeast edge of the railroad cut. Additional surface remains were observed on the south side of the backdirt pile which resulted from the excavation of the railroad cut. The eroded remains of a road track are located 14 meters from the edge of the northwest slope. One additional disturbance factor at the site is the erosion down the slopes of the knoll which has been intensified by the railroad cut excavation, the placement of the backdirt pile, and an old road north of the railroad cut.

One hundred thirty-seven mapped surface artifacts were located on either side of the railroad cut, from the edge of the top of the cut to a distance of approximately 40 meters on the northwest and 23 meters on the southeast. The mapped surface artifacts within this area were collected at the time of the initial survey. Additional artifactual materials located outside of the approximately 75-meter northwest to southeast diameter area were not collected.

With the permission of the BLM, five surfaces of the railroad cut were faced and documented. These revealed that no subsurface remains of the site exist in the remaining site area adjacent to the railroad. Therefore, because no project elements would disturb areas outside of the railroad cut, the project would have no effect on the remaining portion of site Riv-3798. No further action is recommended.

Mitigation. Because project activities associated with the use and rehabilitation of the railroad will not affect the remains of site Riv-3798, no mitigation measures are required.

Significance After Mitigation. No significant impacts to cultural resources are identified for this site.

Reduced Landfill Operations Alternative

Impact. The potential impacts under this alternative are identical with those of the proposed action.

Mitigation. The recommended mitigation measures, and their effectiveness, are the same as for the proposed action.

Significance After Mitigation. No significant impacts to cultural resources are identified for this site.

Rail Access Only Alternative

Impact. This alternative would involve rail operations similar to those of the proposed project, and the potential for impacts would be the same as for the proposed project.

Mitigation. The recommended mitigation measures, and their effectiveness, are the same as for the proposed action.

Significance After Mitigation. No significant impacts to cultural resources are identified for this site.

No Action Alternative

Impact. No impacts would occur to cultural resources under this alternative.

Mitigation. Since there are no impacts associated with this alternative, no mitigation measures are deemed necessary.

Significance After Mitigation. No significant impacts would occur.

b. Riv-3216

Proposed Action

Impact. This site, described in the initial site record form as a lithic scatter with tools and cores, was not relocated and does not lie within the 200-foot corridor surveyed, even though it was recorded as being close to the intersection of the Imperial Irrigation District 230-kilovolt power line and the Eagle Mountain rail line. While it was not found during the survey, the possibility of its continued existence outside the right-of-way must be recognized. Since it has been established that the site is outside the area of potential effect, no direct impact to it should result from completion of the project.

Mitigation. Because the construction of the project will have no direct impact on Riv-3216, mitigation procedures are not appropriate.

Significance After Mitigation. No significant impacts are anticipated from the proposed action.

Reduced Landfill Operations Alternative

Impact. This alternative would not have any effects on this site.

Mitigation. Since there are no impacts, no mitigation would be required.

Significance After Mitigation. No impacts would occur.

Rail Access Only Alternative

Impact. Relative to activities along the rail line, this alternative is identical with the proposed project, and it would not have any significant effect on Riv-3216.

Mitigation. No mitigation measures are required.

Significance After Mitigation. There would be no significant impacts under this alternative.

No Action Alternative

Impacts. This alternative would have an even lower potential to impact Riv-3216 than the project, but the difference is not distinguishable from the project as proposed.

Mitigation. No mitigation measures would be necessary.

Significance After Mitigation. No significant impacts would occur.

3. Land Exchange

a. Proposed Action

Nine isolated artifacts were located within the lands proposed for exchange. These included eight flakes and one potsherd. None of these isolates qualify as eligible for the National Register or as unique resources under CEQA. Recordation of these isolated artifacts has exhausted their potential to aid archaeological research. No impact from the land exchange portion of the proposed project is anticipated and no mitigation measures are recommended.

b. Reduced Landfill Operations Alternative

No cultural resources which are potentially eligible for the National Register were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

c. Rail Access Only Alternative

No cultural resources which are potentially eligible for the National Register were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

d. No Project Alternative

No cultural resources which are potentially eligible for the National Register were located within the areas, and therefore, no impacts would result from this alternative. No mitigation is required.

4. Native American Concerns

Cultural Systems Research, Inc. (CSRI), conducted a study to determine whether, and to what extent, the proposed use of the Eagle Mountain Mine for nonhazardous landfill would impact cultural resources of concern to Native Americans whose traditional territory lies in this area. Their research showed that none of the Native American consultants identified the Eagle Mountains as sacred or having special significance to their people, though all were concerned about the potential impacts discussed elsewhere in this draft EIS/EIR. No impacts to Native American concerns were identified.

No impact on Native American values was demonstrated by CSRI's study, and no mitigation is recommended. Representatives and Elders of the Colorado River Indian Tribes (CRIT), however, were concerned about the effect that using the Eagle Mountain Mine as a landfill site might have on air quality, plants, and animals. The results of any studies of such impacts should be sent to CRIT and to all the tribal groups consulted in the study.

N. Paleontology

Assumptions and Assessment Guidelines. The sensitive paleontological resources identified on the project are nonrenewable scientific resources. For the following environmental analysis, impacts will be considered significant if the proposed action or project were to result in destruction of significant fossil deposits in these sensitive areas.

1. Proposed Action

a. Impact

At the mine/landfill site, proposed areas for fill, new structures, and lay-down and staging areas would be developed by grading and excavation, which could produce impacts to nonrenewable paleontologic resources in sedimentary rocks. Upgrading, realignment, and development of drainage structures along Eagle Mountain Road would also involve excavation. Annual maintenance with excavation equipment might impact nonrenewable paleontologic resources in sedimentary rock units. Because the potential for preserved resources in this area is quite low, however, this impact is not significant.

Any improvements to Eagle Mountain Road at the I-10 exit required by the Riverside County Transportation Department may impact paleontological resources. These consist of vertebrate fossils within stable sediments with developed soil horizons.

Rehabilitation of the railroad and required maintenance activities will include track straightening and alignment, ballast regulation, culvert cleanout and repair, vegetation control, and oiler maintenance in the areas identified as paleontologically sensitive by San Bernardino County Museum. Although potentially significant fossil-bearing deposits were identified along portions of the right-of-way, the proposed railroad rehabilitation activities will not involve excavations or movement of dirt. Therefore, impacts to paleontological resources are not expected in this area.

b. Mitigation

A program to mitigate potential impacts is proposed. The measures outlined below will be required for any major excavations in the areas associated with the I-10 and Eagle Mountain Road interchange.

1) Preparation of a paleontological monitoring program which will include paleontological personnel qualifications, monitoring and recovery methodology, and curation and report standards. The plan will be prepared by a paleontologist who meets the professional standards of the industry as is required by the County of Riverside Planning Department.

The plan will be approved and implemented by the County of Riverside. The plan shall also include a method for coordination of work stoppage by a County representative acting in the role of an authorized officer.

2) Preexcavation survey to recover paleontologic resources exposed in areas of proposed excavation.

3) Monitoring of excavation by qualified paleontologic monitors (as specified in the monitoring plan) to salvage resources as they are uncovered by excavation. This includes the recovery, removal, and processing of adequate samples of sediments containing small to microscopic vertebrate fossils. Monitors should be equipped to salvage fossils as they are unearthed, without unnecessary delays to excavation schedules. Monitors must be empowered to temporarily halt or divert construction equipment (in coordination with the County authorized officer) if necessary to remove large or abundant fossil specimens.

4) Preparation of fossils to a point of identification and stabilization. This includes wet screening of matrix containing fossils to recover small to microscopic vertebrate remains from sediments. Matrix must be removed from large specimens to reduce volumes during storage.

5) Identification of specimens, curation, and storage in an established repository with retrievable collections.

6) Preparation of a report of findings, including an itemized inventory of specimens accessioned into the museum's collections. The report will be completed within three months of the completion of grading in sensitive areas and will be submitted to the County of Riverside, BLM, and San Bernardino County Museum.

7) These conditions must be fulfilled to the satisfaction of the Riverside County Planning Director as part of the conditions placed on the Specific Plan. The San Bernardino County Museum (Robert Reynolds) is preferred by the County of Riverside to complete the monitoring, curation, and reporting program. This institution will serve as the repository for recovered fossil resources and can provide the necessary monitoring and recovery services. If an alternative paleontological contractor is to be used, prior approval must be received from the County Planning Director.

c. Significance After Mitigation

Activities associated with Eagle Mountain road improvements at the interchange with I-10 could result in significant impacts to nonrenewable paleontological resources. These impacts will be mitigated to levels below significance by implementation of a program which includes the measures listed above.

2. Reduced Landfill Operations Alternative

a. Impact

This alternative would result in the same impacts as the proposed action.

b. Mitigation

This alternative will need the same mitigation measures indicated for the proposed project.

c. Significance After Mitigation

The reduced landfill operations could also result in significant impacts to nonrenewable paleontological resources in the area of the Eagle Mountain Road and I-10 interchange. The impacts, however, will be mitigated to levels below significance by the recommended mitigation measures.

3. Rail Access Only Alternative

a. Impact

Because no improvements to Eagle Mountain Road in the vicinity of the I-10 interchange would occur under this alternative, no impacts would occur.

b. Mitigation

Because there would be no impact, no mitigation would be required.

c. Significance After Mitigation

There are no significant impacts associated with this alternative.

4. No Project Alternative

a. Impact

If development does not occur, the paleontological resources in the project area would not be subject to potential impacts.

b. Mitigation

No mitigation measures would be necessary if no impacts occur.

c. Significance After Mitigation

No impacts would occur under this alternative.

O. Energy Consumption/Generation

Portions of the proposed action and its alternatives would not result in any energy consumption/generation impacts. These portions include the land exchange, reverter clause, and railroad and road right-of-way grant. Therefore, only the landfill operations portion of the proposed action and its alternatives which has the potential for energy consumption and generation impacts is discussed below.

1. Energy Consumption and Generation

Assumptions and Assessment Guidelines. Refuse transportation, handling, and disposal require vehicles and equipment which require fossil fuel consumption. Generally, the farther the waste disposal site from the wasteshed, the greater the fuel consumption. The Eagle Mountain landfill project will require the hauling of refuse up to 200 miles from the landfill site. This energy cost is necessary because of the declining available landfills in the area where the waste is generated.

Though the scoping meetings revealed no concerns for energy, the California Environmental Quality Act requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. The discussion in this section compares the energy consumption of "conventional" landfills in the areas of the refuse source with that of the proposed project and its additional energy use associated with transporting refuse outside the refuse source areas. If the overall energy consumption is determined to be wasteful, inefficient, and unnecessary, a significant, adverse energy impact will be determined.

a. Proposed Action

Impact

The proposed action would involve waste transfer, transport, and ultimate disposal at the Eagle Mountain landfill. The location, capacity, and operational details of the various transfer stations have not been determined at this time. Assessment of impacts attributed to the energy-intensive elements of the project are based on transporting 20,000 tpd (16,000 tpd by rail and 4,000 tpd by truck) of waste materials from refuse collection routes to a network of truck and rail transfer stations and then to the landfill. The truck transfer station would be located in either Riverside or San Bernardino County, approximately 75 miles from the landfill.

A summary of the types of equipment needed for transport, transfer, handling, and disposal of 16,000 tpd by rail and 4,000 tpd by truck of refuse at the Eagle Mountain landfill is shown in Table 50. Corresponding estimates of fuel consumption for these activities are shown on

TABLE 50
COMPARISON OF VEHICLES AND EQUIPMENT REQUIRED FOR TRANSPORT AND DISPOSAL OF PROPOSED PROJECT AND REDUCED OPERATIONS ALTERNATIVE

Vehicles	20,000 TPD	16,000 TPD
Transportation		
8-ton capacity packer trucks	2,500	2,000
25-ton capacity transfer/trailer rigs	160	80
22-ton capacity transfer/trailer rigs	486	425
Transfer Operations (Each Station)	5 Stations	4 Stations
200-hp rubber tired loaders	3 Stations	3 Stations
225-hp container handlers	2 Stations	2 Stations
225-hp train car spotter	1 Station	1 Station
Container Handling		
225-hp container handlers	2 @ ea. rail spur	2 @ ea. rail spur
300-hp container handlers	32	26
300-hp overhead cranes	4	3
225-hp container handlers	2	2
Landfill Disposal		
310-hp refuse compactors	12	10
335-hp crawler tractors	10	8
650-hp off-highway trucks	5	4
375-hp rubber tired loaders	2	2
335-hp crawler tractors	3	2
700-hp water trucks (12,000 gal.)	2	2
275-hp motor graders	2	2
400-hp pugmill	1	1
250-hp clump truck	1	1
140-hp crawler tractor	1	1
140-hp compactor	1	1
105-hp crawler tractor	1	1
90-hp backhoe	1	1
200-hp utility truck	1	1
222-hp grader	1	1

Tables 51 and 52. The information in these tables regarding estimates of daily fuel consumption can be summarized as follows:

Refuse transportation	22,800 gallons
Refuse handling and disposal	13,800 gallons
Total	36,600 gallons

The above total corresponds to 1.83 gallons of fuel consumed per ton of refuse disposed.

Implementation of the rail haul project will result in the additional consumption of approximately 20,000 gallons of diesel fuel per day over current "conventional" landfill disposal practices. The fuel consumption associated with the proposed action is primarily due to the proposed rail operations to the landfill site. However, the use of rail transport is more fuel efficient than using trucks to haul the waste approximately 75 miles to the landfill site. The use of one 20,000 tpd capacity landfill site as compared to four 5,000 tpd capacity landfill sites located in the Southland would reduce the duplication of vehicles and equipment.

The proposed rail haul project would use more than double (123 percent) the amount of diesel fuel than conventional landfill disposal practices.

As the solid waste deposited in the Eagle Mountain landfill decomposes, landfill gas will be generated. The LFG generated may contain over 50 percent methane by volume and, if recovered, may represent a potential fuel source. Although energy recovery plans have not been developed, it is anticipated that the LFG will be burned in reciprocating engines, gas turbines, or steam boilers, with subsequent conversion to electrical power. Such a conversion would require further agency approvals and environmental review.

It is estimated that the LFG recovery system could initially generate approximately 16 megawatts (MW) of peak electrical power at the onset of energy recovery operations. After 25 years of landfill operation (year 2017), the LFG recovery system could generate between 24 and 61 MW of peak electrical power. These estimates are based on the following assumptions:

1) LFG generation rates referenced above.

2) LFG as generated has a heating value of 450 Btu per standard cubic foot.

3) The conversion efficiency for electrical generating processes will be 30 percent.

Assuming a maximum initial electrical generation rate of 16 MW and an estimated 85 percent operation schedule, the LFG recovery system would produce approximately 326 million

TABLE 51
FUEL CONSUMPTION FROM
REFUSE TRANSPORTATION
OF 20,000 TPD

Project Phase	Vehicle Type	No. of Vehicles	Miles/day per Vehicle	Average Speed (MPH)	Diesel Fuel Use Miles/gal	Diesel Fuel Use Gal/day	Equivalent Energy Consumption (MMBtu/day)
Refuse delivery	Refuse packer*	1,250	40	25	8.0	6,250	806
Transfer station operations (rail)	Transfer truck/trailer§	24	450	25	5.0	2,160	279
Rail haul	Unit trains	6	300	N/A	N/A	10,425#	1,345
Transfer station operations (truck)	Transfer truck/trailer¶	80	300	50	6.0	4,000	516
TOTAL						22,835	2,946
Total Fuel Consumption, gallons/ton refuse						1.14	
Total Energy Consumption, Btu/ton refuse							147,265

*Transportation from collection route to transfer station. Excludes on-route fuel consumption.
§Transportation to rail spur from transfer station.
#Data on total daily fuel consumption for trains provided by Sierra Research.
¶Transportation to landfill from transfer station.

TABLE 52
FUEL CONSUMPTION FROM
REFUSE HANDLING AND DISPOSAL
OF 20,000 TPD

Project Phase	Vehicle Type	No. of Vehicles	Hours/day	Diesel Fuel Use Gal/veh-hr	Gal/hr	Gal/day	Equivalent Energy Consumption MMBtu/hr	MMBtu/day
Transfer station operations (rail)	Rubber-tired loader	18	20	6	108	2,160	13.93	139
	Container handler	20	20	6	120	2,400	15.48	155
	Train car spotter	2	5	7	14	70	1.81	9
	Transfer vehicle	8	20	5	40	800	5.16	103
	Container vehicla	2	20	6	12	240	1.55	31
Transfer station operations (truck)	Rubber-tired loader	3	19	11	18	627	2.32	46
Container handling yard	Container handling	32	10	7	224	2,240	28.89	289
	Overhead crane (electric)	4	11	0	0	0	3.61*	40*
	Container handler	2	10	6	12	120	1.55	15
Working face of landfill	Refuse compactor	12	10	16	192	1,920	24.76	248
	Crawler tractor	10	10	14	140	1,400	18.06	181
Application of daily cover	Off-highway truck	5	10	7	35	350	4.51	45
	Rubber-tired loader	2	10	11	22	220	2.84	28
	Crawler tractor	3	10	14	42	420	5.42	54
Dust control and road maintenance	12,000-gal tanker truck	2	11	19	38	418	5.16	57
	Motor grader	2	10	7	14	140	1.81	18
Liner construction	Pugmill	1	8	10.5	10.5	84	1.35	11
	10-wheel dump truck	1	8	6	6	48	0.77	6
	Crawler tractor	1	8	6	6	48	0.77	6
	Compactor	1	8	6	6	48	0.77	6

TABLE 52
FUEL CONSUMPTION FROM
REFUSE HANDLING AND DISPOSAL
OF 20,000 TPD
(continued)

Project Phase	Vehicle Type	No. of Vehicles	Hours/day	Diesel Fuel Use Gal/veh-hr	Gal/hr	Gal/day	Equivalent Energy Consumption MMBtu/hr	MMBtu/day
Miscellaneous	Crawler tractor	1	8	6	6	48	2.45	15
	Backhoe	1	2	3	3	6	0.39	1
	Utility truck	1	2	5	5	10	0.64	1
	Grader	1	2	5	5	10	0.64	1
TOTAL						13,797		1,505
Total Fuel Consumption, gallons/ton refuse						0.69		
Total Energy Consumption, Btu/ton refuse								75,250

NOTE: Excludes transportation by collection vehicles, transfer truck/trailers, or rail.

*Based on equivalent of 7 gallons/vehicle - hour fuel consumption.

megawatt-hours of electricity each day. In terms of electrical consumption and generation, the site would become a positive exporter of electrical energy after 7 to 14 years of operation. This is considered a positive long-term impact of the project.

As stated above, project implementation is expected to result in additional consumption of approximately 20,000 gallons of diesel fuel per day. This is equivalent to approximately 2,300 MMBtu, or 650 megawatt-hours of energy consumption each day. The LFG recovery and utilization system is not expected to produce an equivalent amount of energy until peak power production reaches 32 MW. Depending on LFG generation rates and other factors, the landfill will have been operating for 12 to 27 years before this power output is achieved (sometime between the years 2004 and 2017).

Power generation is expected to exceed the total equivalent energy consumption required for refuse collection, transfer, transport, and disposal at Eagle Mountain when plant output reaches 63 MW. This is expected to occur sometime between the years 2013 and 2055 (21 to 63 years after project implementation) and would result in a positive impact on energy consumption.

Mitigation

The project design includes measures to recover energy from landfill gas. Additionally, a preventative maintenance program and equipment electrification program similar to that of the proposed action should be implemented at transfer stations to maintain the operating efficiency of equipment and vehicles. All project equipment and vehicles would be serviced at intervals specified in the manufacturer's recommendations. Where feasible, fuel consumption will be reduced through the use of electrified equipment at the project site.

Significance After Mitigation

The mitigation measures, including components of the project design to recover energy from landfill gas, will lower the proposed action's energy impacts to below a level of significance.

b. Reduced Landfill Operations Alternative

Impact

The reduced landfill operations alternative would involve waste transfer, transport, and ultimate disposal at the Eagle Mountain landfill. The location, capacity, and operational details of the various transfer stations have not been determined at this time. Assessment of impacts attributed to the energy-intensive elements of this alternative are based on transporting a total of 16,000 tpd (14,000 tpd by rail and 2,000 tpd by truck) of waste materials from refuse collection routes to a network of truck and rail transfer stations and then to the landfill. The truck transfer station would be located in either Riverside or San Bernardino County, approximately 75 miles from the landfill.

A summary of the types of equipment needed for transport, transfer, handling, and disposal of 14,000 tpd by rail and 2,000 tpd by truck of refuse at the Eagle Mountain landfill is shown on Table 50. Corresponding estimates of fuel consumption associated with the reduced landfill operations alternative for these activities are shown on Tables 53 and 54. The information in these tables regarding estimates of daily fuel consumption can be summarized as follows:

Refuse transportation	15,840 gallons
Refuse handling and disposal	11,850 gallons
Total	27,690 gallons

The above total corresponds to 1.39 gallons of fuel consumed per ton of refuse disposed for the reduced landfill operations alternative.

Implementation of this reduced rail haul project will result in additional consumption of approximately 11,300 gallons of diesel fuel per day over current conventional landfill disposal practices. As with the proposed action, the majority of fuel consumption from this alternative is primarily due to rail operations. However, the use of rail transport is substantially more fuel efficient than truck transportation. Also, the utilization of one 20,000 tpd capacity landfill site as compared to four 5,000 tpd capacity landfill sites would reduce the duplication of vehicles and equipment.

The reduced landfill operations alternative would represent an estimated 69 percent increase in fuel consumption over current conventional landfill disposal practices. This is a smaller increase than the proposed action's increase.

This alternative will decrease the inflow of refuse to 16,000 tpd and the capacity of the site by 20 percent. At the proposed inflow of 16,000 tons per day, this alternative will limit ultimate power production in energy recovery facilities and lengthen the time before the site would become an exporter of electrical power. The same energy-saving measures included in the proposed action would be incorporated in this alternative's project design.

Mitigation

Mitigation is the same as for the proposed action. No additional mitigation is required.

TABLE 53
FUEL CONSUMPTION FROM REFUSE TRANSPORTATION OF 16,000 TPD

Project Phase	Vehicle Type	No. of Vehicles	Miles/day per Vehicle	Average Speed (MPH)	Diesel Fuel Use Miles/gal	Diesel Fuel Use Gal/day	Equivalent Energy Consumption (MMBtu/day)
Refuse delivery	Refuse packer*	1,000	40	25	8.0	5,000	645
Transfer station operations (rail)	Transfer truck/trailer§	21	450	25	5.0	1,890	244
Rail haul	Unit trains	4	300	N/A	N/A	6,950#	896
Transfer station operations (truck)	Transfer truck/trailer¶	40	300	50	6.0	2,000	258
TOTAL						15,840	2,043
Total Fuel Consumption, gallons/ton refuse						0.99	
Total Energy Consumption, Btu/ton refuse							127,692

*Transportation from collection route to transfer station. Excludes on-route fuel consumption.
§Transportation to rail spur from transfer station.
#Data on total daily fuel consumption for trains provided by Sierra Research.
¶Transportation to landfill from transfer station.

TABLE 54
FUEL CONSUMPTION FROM REFUSE HANDLING AND DISPOSAL OF 16,000 TPD

Project Phase	Vehicle Type	No. of Vehicles	Hours/day	Diesel Fuel Use Gal/veh-hr	Diesel Fuel Use Gal/hr	Diesel Fuel Use Gal/day	Equivalent Energy Consumption MMBtu/hr	Equivalent Energy Consumption MMBtu/day
Transfer station operations (rail)	Rubber-tired loader	12	10	6	72	720	9.29	93
	Container handler	16	10	6	96	960	12.38	124
	Train car spotter	2	5	7	14	70	1.81	9
Transfer station operations (truck)	Rubber-tired loader	2	20	6	12	240	1.55	31
Container handling yard	Container handling	26	10	7	182	1,820	23.47	235
	Overhead crane (electric)	3	11	7	21	231	2.71*	30*
	Container handler	2	10	6	12	120	1.55	15
Working face of landfill	Refuse compactor	10	10	16	160	1,600	20.64	206
	Crawler tractor	8	10	14	112	1,120	14.45	144
Application of daily cover	Off-highway truck	4	10	7	28	280	3.61	36
	Rubber-tired loader	2	10	11	22	220	2.84	28
	Crawler tractor	2	10	14	28	280	3.61	36
Dust control and road maintenance	12,000-gal tanker truck	2	11	20	40	440	5.16	57
	Motor grader	2	10	7	14	140	1.81	18
Liner construction	Pugmill	1	8	10.5	10.5	84	1.35	11
	10-wheel dump truck	1	8	6	6	48	0.77	6
	Crawler tractor	1	8	6	6	48	0.77	6
	Compactor	1	8	6	6	48	0.77	6

TABLE 54
FUEL CONSUMPTION FROM
REFUSE HANDLING AND DISPOSAL
OF 16,000 TPD
(continued)

				Diesel Fuel Use			Equivalent Energy Consumption	
Project Phase	Vehicle Type	No. of Vehicles	Hours/day	Gal/veh-hr	Gal/hr	Gal/day	MMBtu/hr	MMBtu/day
Miscellaneous	Crawler tractor	1	6	19	19	114	2.45	15
	Backhoe	1	2	3	3	6	0.39	1
	Utility truck	1	2	5	5	10	0.64	1
	Grader	1	2	5	5	10	0.64	1
Waste disposal of 4,000 tpd at local landfills (not Eagle Mountain)						3,240		400
TOTAL						11,849		1,509
Total Fuel Consumption, gallons/ton refuse						0.59		
Total Energy Consumption, Btu/ton refuse								75,450

NOTE: Excludes transportation by collection vehicles, transfer truck/trailers, or rail.

*Based on equivalent of 7 gallons/vehicle - hour fuel consumption.

Significance After Mitigation

Along with the eventual positive export of energy resulting from the conversion of landfill gas to electricity, the project design measures identified above will lower the energy impacts of this alternative to below a level of significance.

c. Proposed Action with Rail Access Only Alternative

Impact

This alternative would reduce inflow to 16,000 tons of waste per day by eliminating all truck access to the site. Truck transfer stations would not be required in conjunction with this alternative. Of the 20,000 gallon-per-day increase in fuel consumption estimated in conjunction with the proposed action over current conventional landfill practices, this alternative would result in an estimated savings of 4,000 gallons of diesel fuel per day by eliminating truck transportation to the landfill site from transfer stations (see Table 50).

The rail access only alternative represents an estimated 79 percent increase over current conventional landfill disposal practices. Energy recovery would be similar to the reduced landfill operations alternative.

Mitigation

The same energy-saving measures included in the proposed action would be incorporated in this alternative's project design.

Significance After Mitigation

Along with the eventual positive export of energy resulting from the conversion of landfill gas to electricity, these measures will lower the energy impacts of this alternative to below a level of significance.

d. No Action Alternative

Impact

This alternative will not result in impacts related to fuel consumption or energy recovery.

Mitigation

No mitigation is required.

Significance After Mitigation

There are no impacts related to this alternative other than the 16,400 gallons of diesel fuel required daily to use conventional landfills and no energy recovery. Beneficial energy impacts would occur at other landfills which implement energy recovery systems.

V. Cumulative Impacts

Under the National Environmental Policy Act regulations, cumulative impacts are defined as "... the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time" (40 CFR 1508.7). The California Environmental Quality Act Guidelines Section 15130 requires a discussion of cumulative impacts when they are significant. For such discussions, all past, present, and reasonably anticipated future projects producing related or cumulative impacts must be considered.

A. Cumulative Projects

1. Eagle Mountain and Vicinity

Within the townsite of Eagle Mountain, the most intense current activity is the return-to-custody facility, which houses approximately 271 inmates plus employees. The conditional use permit authorizing this activity was recently modified by Riverside County to allow an expansion up to 500 inmates. The elementary school in the Eagle Mountain Unified School District serves approximately 100 students using the buildings constructed for the high school, while the 30 high school students from the area attend school in Blythe. Remaining uses in the townsite include the Kaiser Steel Resources offices and a small number of residences. In the future, it may be expected that the community of Eagle Mountain will experience growth—both from the influx of employees and families caused by the landfill and RTCF and from general growth in the region. As part of the planning for this growth, a separate specific plan is being prepared for the townsite itself.

The most notable past project to occur in the area was Kaiser Steel's iron ore mine, which consisted of three open pits. The Black Eagle Pit, approximately two-thirds the area of the East Pit, is located in the Eagle Mountains about four miles from the proposed project. The Central Pit, approximately one-half the area of the East Pit, is located in the Eagle Mountains 1.5 to 2 miles from the project site. The East Pit occupies most of the proposed landfill site. All of these areas are highly disturbed, containing haul roads, coarse tailing and overburden piles, and some permanent structures. To some extent, the proposed action will restore the original contours of the Eagle Mountains in the East Pit area (see Figures 96 and 97). The Black Eagle and Central pits will remain unaltered by the project. These two sites are considered as alternatives to the proposed action but eliminated from detailed analysis in this draft EIS/EIR.

The design of the landfill project has established a sequence which would allow future mining activity during the next 60 or 70 years before landfill operations would cover this area. It is not possible to state exactly when or how mining activities might resume, but they would involve procedures somewhat similar to the iron ore mining which occurred on the property for many decades. Any such mining activities would require agency approvals and environmental review.

In addition to the land and facilities leased to MRC and outside of the Eagle Mountain townsite, Kaiser Steel Resources owns or has various mining claims on several thousand acres in the Eagle Mountains. Compared with the period prior to 1982, there has been little activity on this land. Some stockpiled aggregate materials have been sold and shipped from the property via truck, and mineral prospecting activities continue. This type of activity may be expected to continue.

Because of the unique resources and improvements associated with the land and project being considered, several other possible land uses and activities can be imagined, although these are more remote and speculative than the ones described above. The very large stockpiles of tailing material from prior mining may provide the opportunity for additional mineral recovery through chemical processes or specimen collection. No specific proposals for this type of activity are known at this time.

The availability of renewed rail service to Eagle Mountain may provide the opportunity for other uses which could benefit from the service, such as certain manufacturing uses involving bulk materials. Again, no specific proposals for this type of use have been identified. Likewise, recycling by the proposed project could cause future impacts.

The leased area controlled by MRC for the project extends outside of the currently proposed landfill specific plan boundaries. There are no plans to extend landfill activities or related uses to land outside of the landfill specific plan boundaries. The magnitude and lifetime of the project as currently proposed are such that any discussion of potential expansion 115 years from now would be too speculative for any analysis.

Finally, the Eagle Mountain Energy Company (EMEC), unrelated to and not supported by the Eagle Mountain landfill project applicants, has identified its interest in evaluating the possibility of using the East Pit area of the Eagle Mountain iron ore mine site for a hydroelectric pump storage project. EMEC has sought a preliminary permit from the Federal Energy Regulatory Commission (FERC), which, if granted, would establish a priority over other entities seeking a hydroelectric license for a three-year period. This permit does not establish a right to undertake such a project. Pursuant to the Federal Power Act and FERC regulations, EMEC would evaluate over a three-year period the feasibility of the concept, as well as its environmental impact and other factors as set forth in FERC regulations. A copy of the EMEC FERC application can be obtained at the Riverside County Planning Department.

In this concept, water would be pumped up approximately 1,000 feet from an existing lower reservoir to an existing higher reservoir in the East Pit during periods of low demand on the grid, which typically occur at night. During the day when electric demand is high, the stored water would be allowed to flow back down through a turbine generator producing electrical power which is used by the utility customers. The proposed project would be capable of providing 4,500 MW of peaking capacity to the Southern California Edison utility grid.

Any hydroelectric project such as that proposed by EMEC would require NEPA and CEQA review should it ever be proposed. The possibility of any hydroelectric project is considered speculative and remote and not reasonably foreseeable and is, therefore, not further evaluated in this cumulative impact section.

None of the activities mentioned above are authorized or permitted by the discretionary actions addressed in this draft EIS/EIR, but they would contribute to certain cumulative effects within the general project area.

2. Regional Area

Because the eastern parts of Riverside County are not well developed, a larger geographic area may be considered to identify projects which may have cumulative impacts. For purposes of this discussion, a region bounded on the west by Indio, California, and on the east by Blythe, California, was reviewed. Staff from the Riverside County Planning Department and the BLM Desert District office were consulted to identify specific projects or general patterns of land use activity which may have cumulative impacts within this region.

Within the county jurisdiction, residential development is occurring at a moderate pace in and around Blythe. This development is typified by a recently proposed specific plan in the Wiley Wells area, west of Blythe, and is promoted by the availability of jobs associated with the state prison and other activities in Blythe. In fact, some of the residences at Eagle Mountain are rented to people who work near Blythe but were unable to find housing in that area. Thus, continued residential development in and around Blythe may be anticipated. Projections for the desert subregion as a whole indicate that growth would occur at a rate of about 3.5 percent per year, which is relatively high compared to other areas of southern California. At this rate, the amount of urbanized land would approximately double in about 20 years.

Other activities within the county jurisdiction include a few use permits for aggregate mining, two of which are within this region south of Interstate 10. Currently, a Riverside County sanitary disposal site for solid waste exists west of Kaiser Road between Desert Center and Eagle Mountain and serves the communities of Eagle Mountain, Desert Center, and Lake Tamarisk. This landfill is expected to be closed by Riverside County after the proposed project is opened. The remaining land uses or conditions in the area include the development in and around Desert Center, the agricultural uses generally northeast of Desert Center, and vacant open desert.

A variety of public utility developments or corridors occur within this region. These include the Colorado River Aqueduct operated by the Metropolitan Water District, several electrical transmission corridors operated by Southern California Edison, pipelines, and the highway corridors which generally run east-west across this portion of Riverside County. Other anticipated utility developments include a solar energy plant proposed at Ford Dry Lake, which is north of I-10; a second 500-kilovolt electrical transmission line approved between Devers and Palo Verde; a combined cycle power plant at Palo Verde proposed by San Diego Gas & Electric Company, and an approved gas pipeline for Southern California Edison. This list is probably not all-inclusive, but it does indicate the general pattern and variety of utility and service development across the desert region.

There are also recreational uses which occur in various places throughout the region, such as camping, hunting, and off-highway vehicle use.

On an even larger scale, the most significant cumulative impact is continued increases of air emissions in both the South Coast Air Basin and the Southeast Desert Air Basin. This effect is due to a combination of the size and expanse of the Southern California metropolitan area with its emphasis on automobile travel and of local climatic influences which trap and transport pollutants in the region. It is not possible to list all of the specific projects or activities which contribute to this impact.

B. Environmental Effects

The Eagle Mountain community is different from most southern California communities, for it supported a much larger population in the past than it presently contains. It is also owned and controlled by a single entity—Kaiser Steel Resources—so the provision of certain improvements and facilities can be accomplished without the need to coordinate among many landowners. The presence of structures, roads, and utility improvements provides the basis for a response to the demands for services that can be anticipated from future growth. The townsite specific plan that is being prepared will address these service needs in more detail.

Cumulative impacts of concern on a regional basis include those resources that are affected by regional growth. These resources are water quality and quantity, water consumption, traffic, air quality, land use, biological resources, growth inducement and socioeconomics, recreation and visual resources, utilities and services, noise, cultural resources, and energy consumption/generation. A discussion of the project-related cumulative effects on these resources follows.

1. Water Quality and Use

It has been determined that the potential impacts to groundwater quality from the proposed landfill will be mitigated through a variety of measures, enforced by the county and other agencies (Section IV.A.). Potential cumulative impacts arising from the proposed landfill and previous mining operations on groundwater quality are not considered a significant threat to groundwater quality. Disposal of mine process water in the tailing disposal areas could conceivably have affected groundwater in the Chuckwalla Valley; however, water quality data indicate that no significant change in water quality in the nearest wells (Chuckwalla and Eagle Mountain School wells) occurred during and following the years of mine operation. Figure 100 indicates in graphical form the changes in TDS and sulfate concentrations during this period. No discernible trend of change in water quality can be seen from this graph.

Other potential contributors to cumulative water quality impacts include the agricultural uses in the Chuckwalla basin, and the few low-intensity mining or aggregate extraction operations in the region. Several factors indicate that there are no cumulative water quality impacts resulting from these activities: there is little or no recharge into the aquifer from surface runoff; the only constituents of the groundwater which exceed drinking water standards (fluorine, and in some wells boron) are of natural origin; other major development projects noted above are in other basins; and, as noted above, the available data do not indicate a discernible trend in water quality that could be attributed to human activities. Thus, the addition of the landfill project is not expected to contribute to any cumulative water quality impacts in the area.

Regional consumption of the groundwater reserves is expected to remain in an overdraft condition for the reasonably foreseeable future. Thus, any additional water use would represent a cumulative impact on the region's water resources. Because the proposed water uses represent only eight percent of the region's total projected water consumption, the project would not contribute substantially to the region's overdraft condition. Therefore, the project's adverse cumulative impact to the region's water resources is not considered significant.

2. Public Health and Safety

The potential for public exposure to hazardous materials, fires, LFG, or other hazards associated with the project is limited to the project site and its immediate vicinity and the travel corridors used to transport material to the site. As discussed in Section IV.B. of this report, these potential health and safety impacts would be mitigated through design features, operating conditions, and other procedures which will be enforced as conditions on the landfill permit and specific plan to be approved by the County. Among the principal features important in this respect is the remote location of the project site, the remoteness of the private rail line to be used for a portion of the transport distance, and the choice of Eagle Mountain Road and its proposed private extension to reach the site. Each of these features serves to isolate the project operations

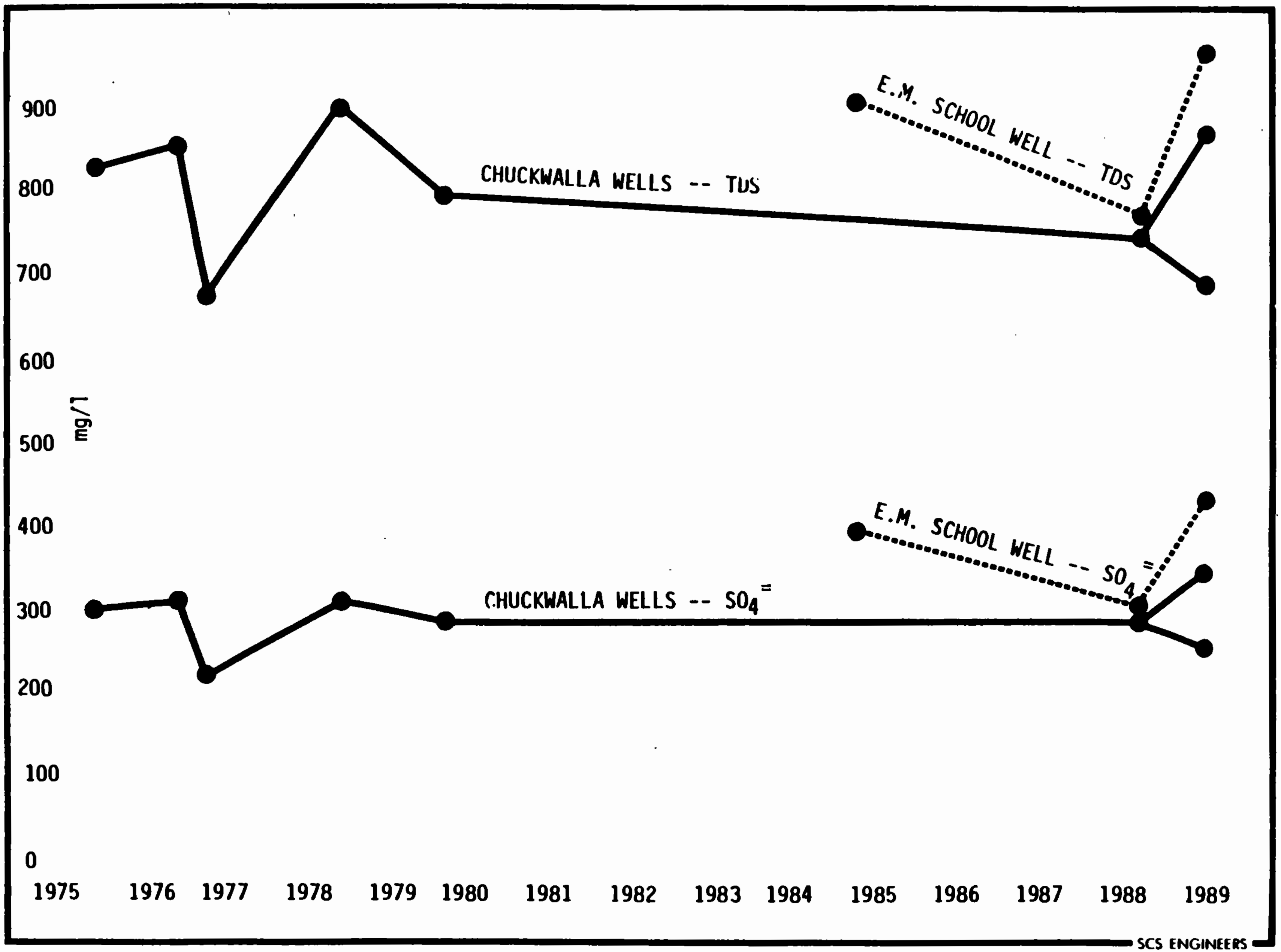


FIGURE 100. CHANGE IN CONCENTRATION OF TOTAL DISSOLVED SOLIDS (TDS) AND SULFATE ION WITH TIME AT CHUCKWALLA WELLS AND EAGLE MOUNTAIN SCHOOL WELL

SOURCE: SCS ENGI , 1/90

from large concentrations of people, as well as from proximity to other uses which may increase cumulative hazards in the vicinity, thus resulting in no significant impact.

The Southern Pacific rail line and Interstate 10 do, of course, pass through more populated areas, such as Coachella Valley. Along these routes the project would cause a small increase in the potential for accidents. The increase in hazards would not be significant relative to that which already exists based on number of daily operations and types of materials transported under existing conditions. Current federal and state regulations provide controls on materials transport to protect public health and safety, and the proposed action would not alter the effectiveness of these controls.

3. Traffic and Transportation

Besides the landfill project, the most likely future traffic generator which would affect local roadways would be export of stockpiled aggregate from the Kaiser Steel Resources properties. Over the past few years, aggregate shipments have amounted to about 10,000 tons per year. This is a fairly small volume and would average fewer than ten truck trips per day. As discussed in the Traffic sections of this draft EIS/EIR (Section III.C. and IV.C.), all of the roadways and intersections in the project vicinity currently function at a Level of Service A and are projected to continue at this LOS for the foreseeable culture. The addition of a few more truck trips per day would not have a significant effect on local roadways. In the event a much more extensive program of aggregate processing and shipment occurs, additional traffic study may be warranted. The implementation of an aggregate processing project would require separate permits from the County of Riverside, which would include a review of traffic effects as part of its environmental review.

Recycling could be accomplished using the return rail trip and thus would not add to a traffic impact. Increased traffic from the general growth within the townsite of Eagle Mountain was considered in the traffic analysis performed for this report by projecting traffic volumes into the future based on regional growth through 1995 and then analyzing the effects of the Eagle Mountain landfill project. Beyond 1995, the traffic analysis recognized that it would take approximately 40 years for roadway volumes to double and that this level of traffic would still be easily accommodated on the local roadway network (see Appendix D, page 39). Attempting to assess cumulative traffic impacts beyond this time would be quite speculative.

In the larger desert region, traffic volumes on Interstate 10, other highways, and local streets will increase as the overall population and extent of human activities increase. Of the major projects identified above, only the residential development around Blythe would be a notable traffic generator. The other developments—transmission lines and other utility projects—would generate traffic during their construction which may cause short-term impacts at specific sites. The cumulative effect of these projects and the proposed landfill would not be significant, however, due the fact that utility projects are not major traffic generators and that the projects are separated by many miles.

4. Air Quality

Increased development and population growth within the townsite of Eagle Mountain will lead to small additional air emissions from automobile traffic. A more significant increment in future air pollution may be associated with future aggregate processing or mining activity. Both of these activities have the potential to generate particulate emissions from specific processing equipment and from fugitive dust sources. Mining equipment driven by internal combustion engines would also increase nitrogen oxide emissions and other pollutants of concern. At the time any of these activities are proposed, additional analysis will be performed and specific permit requirements will be established. The baseline monitoring and visibility monitoring incorporated in the Eagle Mountain landfill project will provide data to allow a more accurate analysis and prediction of the cumulative effects of the future activities. These future reviews would help reduce local air quality impacts. However, given the current levels, air impacts would probably be significant.

The regional cumulative air pollution impacts, which are significant, are addressed in the South Coast Air Quality Management Plan (1989), which can be reviewed at the County of Riverside planning offices. If fully implemented and successful, the South Coast Air Quality Management Plan would lead to consistency with the national ambient air quality standards by the year 2007.

5. Land Use

This proposal is not in serious conflict with any general goals, standards, or policies of the General Plan. The project would be potentially consistent with the Desert and Mountainous Areas designation which surrounds the East Pit area, as well as the Category IV designation of the townsite area. Actual consistency determinations need to be made by the County after their review of the project and its compliance with the general environmental goals stated in the General Plan. This determination is part of the General Plan amendment and other actions necessary to approve the project. Because of the low level of development taking place in eastern Riverside County, the removal of open space is not a regionwide concern and is not considered a significant cumulative land use impact.

The use of remote desert sites for waste disposal is also being proposed in several areas of the Mojave Desert (i.e., Class I near Hector, Class I near Ludlow, Class III near Amboy, and low-level radioactive near Ward Valley). The use of the desert areas to dispose of urban area waste is a potential cumulative land use impact. However, given the distance between the proposed project and those listed above, the relatively small percentage of desert land used for the combined projects and the pressing need for landfill space, this land use impact is not significant.

The historical patterns of land use in the desert region have been influenced strongly by the east-west travel corridors. The continuing development of utility installations and growth of small communities which serve the travel corridors is consistent with this general pattern. The landfill project itself is not influenced by this pattern since its location was determined by the presence of past mining activity. Transport to and from the project, however, will use rail and highway corridors that are well established. None of the projects considered in the larger desert region would have a marked influence on the overall pattern of land uses, and no significant cumulative impacts are anticipated.

6. Biological Resources

Cumulative effects on biological resources are caused by land development, intensive land uses, off-highway vehicle activity, and other events which reduce habitat and have adverse effects. At the same time, however, resource management efforts and larger plans are under way to improve habitats and have beneficial effects. The combination of effective resource management plans that avoid impacts to biological resources of concern with specific mitigation measures to compensate for unavoidable impacts to resources from specific projects will ensure mitigation of cumulative biological impacts.

In the immediate vicinity of the project, several site-specific concerns must be addressed in and around the Eagle Mountain townsite as it develops. These include the presence of an isolated area of desert tortoise habitat and the presence of several sensitive plant species. A separate specific plan is being proposed for the Eagle Mountain townsite, and the environmental documentation for that plan must address these issues. Mitigation measures similar to those proposed for the landfill project—preservation of certain habitat areas and other measures to enhance local habitat values—will be necessary for the townsite specific plan.

On a more regional scale, most of the typical utility developments impact relatively small areas of land and do not contribute major increments to the cumulative loss of habitat. Of more importance are the gradual loss of native habitat as agricultural and residential uses increase and the increasing use of the desert areas for recreation. These activities have resulted in a cumulative loss of habitat which has contributed to the listing of several desert species as threatened or endangered. In response to these cumulative effects, several wildlife management plans including habitat conservation plans (HCPs) are in place or are being developed by state and federal agencies. An HCP determines a species' habitat requirements, its susceptibilities to the impacts of urban development, and the conservation measures necessary to ensure its survival. An HCP for the desert tortoise has been prepared for Clark County, Nevada. Another HCP is being discussed for the Mojave desert tortoise in eastern Riverside County and adjoining lands in Arizona. The Multiple Species Habitat Conservation Plan (MSHCP) attempts to identify and protect ecosystems which sustain biodiversity in Riverside County and maintain the viability of threatened, endangered, and candidate species. The draft report was submitted to the County in January 1991. All of these plans are available at state and federal agencies. The net effect of these plans, in conjunction with project-specific mitigation measures, should reverse the trend of cumulative habitat losses caused by man's activities.

Likewise, any project which might impact endangered or threatened species will have to comply with mitigation measures required by the USFWS and/or CDFG.

The proposed Eagle Mountain landfill project will have cumulative effects on two plant species of concern, Alverson's foxtail cactus and California barrel cactus. These impacts are not considered significant. The loss of substantial populations of these two species of cactus at the proposed landfill site contributes to the body of information that could lead to the possible federal listing of Alverson's foxtail cactus and the reevaluation of the candidacy of California barrel cactus. The status of the current populations of these species, their distribution, and their potential for listing is contained in the appropriate edition of the *Federal Register.*

Loss of desert tortoise habitat due to project development is minor and would not significantly add to the cumulative loss of habitat in the region. However, cumulative impacts to the desert tortoise could be significant due to population fragmentation. Reactivation of the Eagle Mountain rail line and the introduction of 400 truck trips per day on Eagle Mountain Road could cause a significant cumulative impact to tortoise populations in the region. The rail and road system would act as barriers to tortoise movements and cause subpopulations to become isolated to the point where a random natural occurrence (e.g., disease, drought, fire) could cause the extinction of one or more of these subpopulations. The tortoise population in the region has already been fragmented somewhat because of I-10 and the Coachella canal. Barrier-culvert systems under the railroad tracks and Eagle Mountain Road would allow for genetic interchange between tortoise subpopulations and allow recolonization of areas where tortoise subpopulations have died out due to random natural factors. A system of barriers along portions of the railroad right-of-way and Eagle Mountain Road, to prevent road/train kills, tied into a series of under-road/track culverts is proposed as mitigation for the Eagle Mountain landfill project (see Appendix F).

A potential increase in the regional raven population could occur as result of the establishment and operation of the Eagle Mountain landfill project. Ravens are known to prey upon juvenile tortoises and have the potential to impact the tortoise populations at both the local and regional level. Increased depredation of tortoises would be a significant cumulative impact. The project proponents propose to initiate a long-term raven monitoring program to detect any increases in the raven population in the vicinity of the landfill. If a significant increase in raven numbers is detected once landfill operations begin, then an active raven control program will be initiated, in accordance with BLM and USFWS direction, to control ravens. Implementation of the barrier/culvert system discussed previously, the proposed tortoise population monitoring program, and a raven monitoring and control program would reduce any significant cumulative impacts to the desert tortoise to a level below significance. In addition, the BLM has a raven management plan (draft 1990) which will address cumulative impacts caused by ravens.

7. Growth Inducement and Socioeconomics

A discussion of the potential for the proposed action to be growth-inducing is discussed in Section IV.H. of this report. The growth-inducing impacts are found to be positive and considered insignificant because much of the service capability required by the increased population is already available. The primary regional impact will be the increase in the costs associated with solid waste disposal; however, as is discussed in Section IV.H. of this report, this increase is not considered significant.

8. Visual, Recreation, and Wilderness Resources

As discussed in Section IV.J. of this draft EIS/EIR, the visual contrast of the completed landfill will be noticeable from some key observation points and will attract attention and dominate the characteristic landscape from nearby viewpoints. The net result of the project, however, will be a reduction in the visual contrast level from strong to moderate. In this sense, the project will have less visual impact on recreation areas than the existing conditions. This effect of the proposed landfill project is probably unique among large projects in remote areas.

Although no other projects in the region of the scale of the proposed landfill are being considered, the continued growth in the desert communities and continued expansion of utility and transportation facilities leads to a cumulative change in the visual character of the desert areas. As noted above in the Land Use discussion, this change is occurring primarily in the major transportation and utility corridors. While the landfill project itself is distant from the Interstate 10 corridor, it would contribute indirectly to the cumulative increase in human activities by the rail and truck transportation associated with it.

The increased recreational activities of the growing desert population will most likely have an impact on recreation resources over time. Increased activities such as off-highway vehicle use and camping on public lands often result in disturbances to wildlife and vegetation. However, these disturbances are not considered significant for this area based on past, present, and foreseeable use levels.

The landfill construction and operations, BLM/Kaiser Steel Resources, Inc., land exchange, Eagle Mountain rail line and Eagle Mountain Road Extension right-of-way grants, and Riverside County Plan Amendment will have no direct impact on wilderness resources. The project area and immediately adjacent lands were excluded from wilderness consideration due to the extensive open pit mine operations associated with the Eagle Mountain iron ore mine.

There will be no reduction in size of designated Wilderness Study Areas, nor will there be any immediate physical effects or surface disturbance to these areas.

Indirect visual impacts on wilderness resources will be limited to views of the project area from certain vantage points within the Eagle Mountain WSA. However, it is important to note that the area will not change from pristine to less pristine, but rather from severely degraded to reclaimed. The impacts are capable of being reclaimed and the reclamation will, to the extent practicable, be done while the landfill activities are in progress. Topographic contouring, replacement of topsoil, and reseeding of plant cover will be done to meet the goal of restoring the disturbed surface to the point that natural succession will occur. These and other mitigation measures included in the project design will eliminate or reduce these indirect impacts on wilderness to levels considered insignificant.

Additionally, the potential for visually impacting the surrounding area by night lighting is significant. Implementation of the mitigation measures will lower potential night lighting impacts to a level of insignificance. On a more regional scale, however, higher levels of night lighting are expected as growth occurs near Blythe and in the other desert communities. While increased night lighting may not be considered a significant regional impact, it would nevertheless alter the overall character of the desert and have a negative effect on the aesthetic enjoyment of wilderness areas.

9. Utilities and Services

The only major utility or service which may be subject to major cumulative impacts is water. Most of the water used in the region around the project is from local wells. The historical data indicate that the water table has been lowered by removal of water for the old mining operations and the continuing agricultural and residential uses in the vicinity. Under the present system, all drinking water for the community of Eagle Mountain is trucked in from outside. As the community grows, provision of water service in this manner may become less feasible. At some point in time, it may be more economical to install water treatment works to make the well water meet potable standards. This particular service question will have to be addressed at a later time in the specific plan for the Eagle Mountain townsite.

Total usable water reserves in the northeastern portion of the Chuckwalla Valley were estimated by Mann (1986) to be approximately one million acre-feet, assuming 100 feet of saturated sediments and a specific yield of 15 percent. This estimate is likely conservative considering the fact that 200 or more feet of saturated sediments underlie the central portion of the Chuckwalla Valley. The U.S.G.S. estimated that the usable water reserves total 6 million acre-feet. The water consumption of the landfill and the Eagle Mountain townsite, when combined with existing uses, will not result in a significant cumulative impact.

Other services are generally available in the area, although certain services are provided only at a very low level, in keeping with the rural nature of the region.

10. Noise

As discussed in Section IV.L. of this draft EIS/EIR, concern has been expressed that sounds emitting from the proposed Eagle Mountain rail system would adversely affect the Coachella Valley fringe-toed lizard. A laboratory study investigating the effect of off-highway vehicle sounds on the auditory response of the fringe-toed lizard concluded that sound levels greater than 95 dBA of cumulative durations greater than 500 seconds result in hearing loss. This threshold (95 dBA) is used as the basis for the analysis of the acoustic impacts from the increased railroad noise onto the fringe-toed lizard habitat. It is concluded that since the daily increase in noise levels from train operations along the Whitewater preserve (for the fringe-toed lizard) segment of the Southern Pacific line does not exceed 74.7 dBA, this effect is not considered a significant impact.

Also, the increased rail operations will not represent a significant cumulative impact to the fringe-toed lizard because there are no known noise sources other than the rail line in the Whitewater preserve and the maximum train pass-by noise level measured at a distance of 50 feet was 79 dBA $L_{eq}(10)$, as shown in Table 5 of the noise appendix (H).

There is the potential for cumulative short-term noise impacts to occur during the renovation of the Eagle Mountain townsite. Figure 99 shows the 75 dBA L_{max} noise contour for the landfill operations including the pug mill and container handling yards. If a noise point source occurs in the landfill area near the landfill border and in the townsite near the border concurrently, a cumulative noise impact could occur. This impact is short-term and would be addressed in the townsite specific plan currently being prepared. This is not considered a significant impact.

11. Cultural Resources

As previously discussed in this document, cultural resources are a nonrenewable, finite resource. Destruction of this significant resource is not only a regional but also a national concern. The National Historic Preservation Act and the Advisory Council on Historic Preservation (ACHP) regulations, "Protection of Historic Properties" (36 CFR 800) "require Federal agencies to identify historic properties which may be affected by an undertaking, gather sufficient information to evaluate the eligibility of the properties for the National Register, and afford the ACHP the opportunity to comment." The County of Riverside also requires that cultural resources be addressed and that impacts to these resources be mitigated in projects requiring County approval. These measures serve to reduce the project-specific and cumulative impacts to cultural resources from major projects. Vandalism and other illegal activities continue to affect adversely cultural resources. The only way to reduce this impact is through greatly increased law enforcement activity and educational programs in our primary and secondary schools emphasizing the need for preservation of our cultural resources in the desert regions.

One site, identified during the archival research, was recorded within the railroad right-of-way. No remains of this site were found within the right-of-way. It is possible that this site remains outside of the project area; however, there will be no effect on this site as a result of the proposed project.

One site (Riv-3798) was located adjacent to the railroad. The center of this site has been removed during construction of the railroad, and there are no cultural materials remaining within the area of potential effect. Therefore, there will be no effect on this site as a result of the proposed project.

Nine isolates were identified within the land exchange portion of the proposed project. Under 43 CFR 8111.0-6 (e), isolated artifacts are recorded but are not evaluated as cultural properties; that is, they are not subject to Section 106 consultation. As a result, there will be no cumulative impacts to these cultural resources. Under CEQA, isolates are evaluated for significance and, if found not significant, so recorded. The nine isolates were not identified as significant and no cumulative impacts are anticipated.

12. Energy Consumption/Generation

It is possible that LFG generated by the project will be used on-site and/or be exported from the site to relieve energy requirements in the region. During the early years of the landfill operation, little LFG would be generated; however, after 100 years of operation, up to 80 million cubic feet could be generated in a day. Within the next 100 years, there will be significant technological changes, however, including the methods by which wastes are generated, collected, recycled, and ultimately disposed. The quantities and types of materials requiring landfill disposal and, hence, the amount of LFG generated are subject to change pending future technological advancements and environmental, economic, and political considerations.

For the larger desert region, many of the anticipated development projects are related to generating or providing energy. These include new power plants, fossil fuel pipelines, and electrical transmission lines. While the distances across the desert amount to an obstacle to be overcome in transmitting energy, the remoteness of the desert and the regular availability of sunlight and wind allow it to contribute to the greater energy supply of the region. Thus, the cumulative effect of activities in the desert region relative to energy consumption are not considered significant.

VI. The Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The size and lifetime of the proposed Eagle Mountain landfill are larger than most modern projects. Over 2,000 acres would be directly affected by the project, and several thousand more are either within the leasehold of MRC or in the adjacent community of Eagle Mountain, which would be indirectly affected. The estimated active lifetime for the landfill is 100 years, perhaps twice as long as most other landfills or similar public works projects. After formal closure of the landfill, maintenance and monitoring activities would continue for several additional decades. Given these factors, the characterization of the project as a short-term use may seem surprising. When measured by human terms, the project would outlast most foreseeable activities, regulations, developments, and land uses. Relative to certain components of the natural environment, however, the project is indeed short term.

The three most important topic areas in which the potential long-term effects of the project are most critical are water quality, biology, and public health and safety.

Groundwater in the Chuckwalla basin is, for all intents and purposes, basically a nonrenewable resource. There is little or no recharge from surface waters and no foreseeable proposals for artificial recharge on any large scale. While the water quality is not particularly good, the groundwater is used for irrigation and as a potable source by some people. The project design has many features and conditions to avoid groundwater contamination, but if it were to pollute the groundwater in the Chuckwalla basin, the impact would be one of very long-term significance. This is because the effect would probably not be noticeable at existing wells for many years, and by the time it was noticed, the contamination would affect such a large volume of groundwater that remediation of the problem would be extremely difficult.

Current problems with groundwater pollution in other areas invariably arise from activities which occurred many years ago and are just now becoming apparent. Modern regulations—those promulgated within the last decade—recognize the inherent difficulty of protecting groundwater quality or restoring it once contamination has occurred. The project includes design measures and conditions which reflect the modern understanding of the importance of protecting groundwater. The low permeability liner leachate collection and treatment system, required monitoring wells, and regulatory oversight are all measures which serve to reduce the potential for groundwater contamination to an insignificant level. Two other factors not imposed by regulations also reduce the potential impact: the processing of virtually all the municipal waste for the project through transfer stations and compactors will remove much of the residual moisture in the refuse which could lead to leachate formation, and the arid climate of the site itself reduces the potential for infiltration and leaching of surface waters through the landfill. Thus, the potential for a long-term effect on groundwater quality has been reduced to an insignificant level.

Certain of the potential biological effects of the project involve general habitat considerations which cannot be addressed through a simple survey and implementation of response measures. For example, the immediate effects of construction along the railroad line and resumption of rail operations on desert tortoise can be assessed and reduced through surveys and improvements as proposed within the project. The long-term effects on desert tortoise populations are less certain, however. The immediate effect of removal of bighorn sheep water sources can be offset by replacing the water sources. The long-term habitat effects of the project are not as clear. For this reason, the mitigation of certain potential biological impacts of the project depends on subsequent surveys and monitoring as the project is implemented. The studies themselves are not mitigation, but they are necessary to clarify longer-term effects of the project and appropriate responses to those effects.

The Public Health and Safety section of this draft EIS/EIR assesses the potential impacts resulting from implementation of this project. Even though the proposed landfill is a Class III nonhazardous solid waste landfill, the potential exists for small amounts of hazardous waste to enter the waste stream. Increased public awareness is likely to reduce the amount of inadvertent disposal of hazardous waste into the waste stream. Nevertheless, all waste will be inspected at a transfer station for hazardous materials prior to being placed in a closed container and sent by rail to the Eagle Mountain landfill. When the trash container arrives at the landfill, the waste will again be inspected for hazardous waste. At this time, any hazardous materials will be separated from the waste and be stored in a limited area and then shipped by licensed hauler to a hazardous waste disposal site. As a result of these procedures, no significant impact to the public's health and safety is anticipated.

All landfills produce landfill gas and landfill gas condensate, potentially hazardous to the landfill workers and the public at large. The project as proposed includes a liner and LFG collection system and LFG condensate collection system to prevent groundwater pollution. The specific requirements for LFG monitoring and any special building designs will be established by the County Department of Health and the South Coast Air Quality Management District during their reviews of their respective permits for the project. These measures will lower the potential public health and safety effects of LFG and LFG condensate to below a level of significance.

The potential for fires at the landfill and along the rail right-of-way exists. Surface fires are generally small and of short duration and easily controlled. The primary measure to avoid the occurrence of subsurface fires is to ensure that the LFG recovery system is properly operated and maintained. A regular inspection and selective removal of vegetation along the rail right-of-way will reduce the potential for right-of-way fires to below a level of significance.

Earthen cover material will be placed over the newly placed refuse at least once per day. This will minimize the propagation, harborage, or attraction of flies, rodents, or other vectors at the landfill site and reduce potential impacts to public health and safety below a level of significance.

Measures to protect workers from specific hazards, such as noise, local dust, and other items, would include specifications for personal protective equipment—ear plugs, gloves, hard hats, and dust masks—or the provision of enclosed cabs on certain pieces of heavy equipment and mandatory use of eye shields and gloves for some jobs. Also, emergency response plans for accidents involving nonhazardous solid waste typically involve the assignment of an emergency response coordinator; the maintenance of equipment to contain and clean up any spilled material; procedures and information for notifying local fire departments, health departments, and other officials involved with public safety; and the retention of outside contractors to clean up certain types of releases. This plan would be implemented by Southern Pacific, its customers who own the materials being transported, the local fire department in the jurisdiction where an accident occurs, and the Riverside County Department of Health, Hazardous Materials Unit. These existing plans should be more than capable of responding to the accidental spillage of nonhazardous compacted solid waste.

Thus, the Eagle Mountain landfill project is not likely to pose any long-term risks to the public's health or safety.

The Eagle Mountain landfill project is justified now because it would provide 20,000 tpd waste disposal for the anticipated shortfall in the counties of Los Angeles, San Bernardino, Orange, and Riverside. The areas in southern California with the most serious shortages of landfill capacity are also the areas with the most active proposals for waste-to-energy facilities and curbside recycling programs. Currently, those areas are principally Los Angeles County and the valley area of San Bernardino County. The 1985 Los Angeles County Solid Waste Management Plan stated that virtually all of Los Angeles County's permitted landfill capacity for residential and commercial waste would be exhausted by the end of 1991 without additional capacity increases. Similarly, approximately seven years of permitted landfill disposal capacity exist in the valley area of San Bernardino County (SCAG 1988:1-1).

A great many of the cities of the San Gabriel Valley and their citizens strongly opposed the proposals to build waste-to-energy facilities. In addition to extending the lifetime of waste disposal in the valley, the incinerators are perceived as major sources of air emissions in the most polluted portion of an air basin which is, itself, the most polluted in the country. Thus, a serious consideration of a wide range of alternative waste disposal options, particularly rail haul of waste to outlying counties, recycling, and composting, is necessary now (SCAG 1988:1-2).

VII. Significant Irreversible Environmental Changes

For most landfill or other land development projects, the most significant irreversible commitment necessary is the land itself on which the project is located. For the Eagle Mountain landfill, however, the land in question has already been subject to very severe disturbance through past mining activities. Its commitment to the project does not represent a major loss of land usable for other purposes or usable as biological habitat. In a sense, the irreversible change in the land has already occurred, and the project involves a beneficial use and restoration of the disturbed land.

The materials and energy necessary to implement the project will be irreversibly committed. The material commitment is not significant—it involves refuse and includes a major reuse of spoil material on-site as part of the project. The energy consumption of the project is high; but the energy consumption of all project alternatives is also high. As conventional landfills in the metropolitan areas become full, more energy will be necessary to transport refuse to more distant landfills whether they are conventional landfills at intermediate distances or desert landfills at remote distances. The Eagle Mountain project has several factors which reduce its net energy consumption relative to other potential disposal options—it emphasizes rail transport, it starts with a large pit and available cover material, and because of its size, it may have the potential to recover a significant amount of energy through the combustion of landfill gas in the future. Thus, the materials and energy commitments of the project are not considered significant.

There is the potential for covering mineral resources in the project area with the landfill. This would represent a commitment of these resources to non use, except that the phasing of the project permits the removal of these resources in the future. Economics and need will determine when and if these resources will be recovered. Given the time remaining to remove the majority of these mineral resources (i.e., 75 years), this is not seen as a significant irreversible change.

VIII. List of Preparers

Original drafts of this EIS/EIR were prepared by staff of Regional Environmental Consultants (RECON), in San Diego, California. The RECON project manager was John P. Larson. RECON staff participating in this work include:

M. A. Alexandra Acosta-Mathis, B.A. Neurobiology
Environmental Analyst
David Bolland, B.S. Environmental Planning and Management
Associate Analyst
Cheryl L. Bowden, B.A. Anthropology
Project Archaeologist
Denise Brown
Production Typist
Dayle M. Cheever, B.A. Anthropology; M.A. Anthropology
Project Archaeologist
Sandra Fayette, B.S. Education
Research Analyst
Diana K. Gleave, B.A. Anthropology; M.S. Administration
Environmental Analyst
Loretta L. Gross
Production Supervisor
Donald E. Haines, B.A. English; M.A. Comparative Literature
Environmental Analyst and Assistant Project Manager
Stacey Higgins
Production Specialist
Jerry H. Hittleman, M.A. Urban and Regional Planning
Environmental Planner
Kristine Kemman
Technical Illustrator
John P. Larson, B.S. Chemistry
Project Manager
David N. Lawhead, B.S. Biology; M.S. Wildlife Ecology
Project Biologist
Jeff H. Newman, B.A. Biological Sciences
Ecologist
Jan M. Peters, B.S. Environmental Science
Environmental Analyst
Harry J. Price, B.A. Anthropology
Senior Technical Illustrator
Frank Ritz, B.A. Anthropology
Project Archaeologist
Gerald A. Scheid, B.S Biology; M.S. Ecology
Ecologist

Lee A. Sherwood, B.A. Geography; M.A. Geography
Environmental Planner
Bobbie A. Stephenson, B.S. Botany; M.S. Biology
Certified Ecologist, E.S.A.
John Whitehouse
Project Archaeologist
Lori J. Woods, B.A. Landscape Architecture
Environmental Planner

The following subcontractors supplied analyses of special topics for RECON:

DKS Associates, Traffic Engineering (Gary Hamrick and Carleton Waters)
Mestre Greve Associates, Noise Analysis (Paul Dunholter, Kelley Van de Ver, and Henry Moon)
San Bernardino County Museum, Paleontology (Robert E. Reynolds)
Cultural Systems Research, Inc., Ethnography (Lowell John Bean, Ph.D., and Sylvia Plane)

Information regarding the project was provided by the following personnel of Mine Reclamation Corporation:

Robert H. Collins, III, President and Chief Executive Officer
Gary Kovall, Senior Vice President
Robert D. Coale, P.E., Technical Director

Additional information regarding the project was provided by the following personnel of Kaiser Steel Resources:

Gerald A. Fawcett, Senior Vice President, Corporate Development
Orlo J. Anderson, Manager, Mining Properties
Jerry Stokes, Assistant Manager, Mining Properties

Technical data and some analyses were provided by the following personnel of SCSEngineers:

Mark B. Beizer, P.E., Vice President
Ray Grier, P.E.
Mark D. Alpers
Julie Benson

The PRA Group, Inc.

Bruce Murphy
Ken Theisen

Lead agency staff responsible for the preparation of this EIS/EIR are:

Bureau of Land Management, Palm Springs/South Coast Resource Area, Marianne Wetzel
County of Riverside, David Mares

Other persons and agencies consulted during the preparation of this EIS/EIR include:

C & M Engineering Associates
- Dean Affeldt
- Charles L. Cole
- Gary L. Koontz

California Department of Fish and Game
- Vern Bleich
- Kim Nichol
- Jim St. Amant
- Fred Worthley

Desert Center Unified School District
- Miki Truitt

National Park Service, Joshua Tree National Monument
- Air Quality Division, Denver
- Cooperative National Park Resources Studies Unit
- Regional Office, Western Region

Riverside, County of
- Fire Department
  - Ray Regis
  - Adam Shay
  - Chief Stevens
- Library Services
  - Judith Auth
- Planning Department
  - Richard Archibeque
- Sheriff
  - Captain Doyle

Southern Pacific Railroad
- Tim Kava

U.S. Department of the Interior
  Bureau of Mines
    Mike Dunn
  Bureau of Land Management
    Palm Springs/South Coast Resource Area
    California Desert District
    California State Office

U.S. Environmental Protection Agency
  Carolyn Yale

U.S. Fish and Wildlife Service
  Laguna Niguel Office

Legal compliance review was provided by:

Best, Best, and Krieger

Browning-Ferris Industries
  Bill Hutton

Gresham, Varner, Savage, Nolan and Tilden
  James Good
  Patrick Mitchell

IX. References Cited

Anderson, O. J.
1989 Personal communication with SCS Engineers. Kaiser Steel Resources. November 7.

1990 Personal communication with SCS Engineers. Kaiser Steel Resources. July 5.

Anderson, S. H.
1989 Personal communication. U.S. Fish and Wildlife Service.

Armentrout, D.
1990 Personal communication. Biologist, Bureau of Land Management, Riverside, California.

Bedwell, Stephen F.
1970 *Prehistory and Environment of the Pluvial Fort Rock Lake Area of South Central Oregon.* Ph.D. dissertation, University of Oregon, Eugene.

Berry, K. H., T. Shields, A. P. Woodman, T. Campbell, J. Robertson, K. Bohuski, and A. Karl
1986 Changes in the Desert Tortoise Populations at the Desert Tortoise Natural Area Between 1979 and 1985. U.S. Department of the Interior, Bureau of Land Management, Riverside, California.

Bleich, V.
1990 Personal communication. Biologist, California Department of Fish and Game, Bishop, California.

Briggs, J. L., and M. W. McLaughlin
1988 Disposal of Municipal Landfill Gas Condensate. Presented at 81st Meeting of Air Pollution Control Association, June, Dallas.

Brown, P.
1990 Bats of the California Desert Conservation Area. Report submitted to the Bureau of Land Management, California Desert Plan Program, Riverside, California.

Bureau of Land Management
1980 The California Desert Conservation Area Plan. U.S. Department of the Interior, Bureau of Land Management, Desert District, Riverside, California.

1988 The Monuments Draft Environmental Impact Statement. Boundary Adjustments: Death Valley and Joshua Tree National Monuments. California Desert District. July.

1989 Summary of Amendments to the CDCA Plan, 1981-1987. U.S. Department of the Interior, Bureau of Land Management, Desert District, Riverside, California. February 8.

1990 Draft Raven Management Plan for the California Desert Conservation Plan. California Desert District, Riverside, California.

Bureau of Reclamation

1989 Biological Assessment: Listed, Endangered and Candidate Species, Coachella Canal In-Place Lining Project. Ecological Resources Division, Denver.

Burge, B. L., and W. G. Bradley

1976 Population Density, Structure, and Feeding Habitats of the Desert Tortoise, *Gopherus agassizii,* in a Low Desert Study Area in Southern Nevada. In *Proceedings of the 1976 Desert Tortoise Council Symposium,* edited by N. J. Engberg, S. Allen, and R. L. Young, pp. 51-74, Las Vegas.

California, State of

1975 *Comprehensive Water Quality Control Plan for the San Diego Basin.* Water Resources Control Board, Regional Water Quality Control Board, San Diego Region.

1979 Sources of Powerplant Cooling Water in the Desert Area of Southern California. DWR Bulletin 91-24. Department of Water Resources.

1989a Proposed Identification of Districts Affected by Transported Air Pollutants Which Contribute to Violations of the State Ambient Air Quality Standard for Ozone. Air Resources Board. October.

1989b California Natural Diversity Data Base. Nongame-Heritage Program, California Department of Fish and Game.

Christiano, John P.

1990 Memorandum to Superintendant, Joshua Tree National Monument, regarding Eagle Mountain Landfill Project, National Park Service Air Quality Division, Denver, October 24.

Collins, W. E.

1982 Mineral Resources of the Eagle Mountains, Geology and Mineral Wealth of the California Transverse Ranges. *South Coast Geological Society Publication* 418-422.

Coombs, E. M.

1979 Food Habits and Livestock Competition with the Desert Tortoise on the Beaver Dam Slope, Utah. *Proceedings of the 1979 Desert Tortoise Council Symposium,* edited by E. St. Amant, pp. 132-147, San Diego.

Dubois, R. L., and R. W. Brummett

1968 Geology of the Eagle Mountain Mine Area Found in Ore Deposits of the United States, 1933-1967. *American Institute of Mining Metals Engineer* 2(76):1592-1606.

Ernst, C. H., and R. W. Barbour

1972 *Turtles of the United States.* University of Kentucky Press, Lexington.

Giessner, F. W.

1963 Data on Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California. DWR Bulletin 91-7. Department of Water Resources.

Hansen, R. M., M. K. Johnson, and T. R. Van Devender

1976 Foods of the Desert Tortoise, *Gopherus agassizii,* in Arizona and Utah. *Herp.* 32:247-251.

Hanson, J. C.

1990 Landfill Liner Material Evaluation, Eagle Mountain Project, Riverside County, California. December.

Hawke Engineers

1973 Letter report to Colorado River Basin Regional Water Quality Control Board. August 28.

Hays, L.

1991 Personal communication. Biologist, U.S. Fish and Wildlife Service, Laguna Niguel, California. February 27.

Heuston, Mark

1989 Personal communication. Joshua Tree National Monument. November.

Hohman, J. P., R. D. Ohmart, and J. Schwartzmann

1980 An Annotated Bibliography of the Desert Tortoise. Desert Tortoise Council Special Publication No. 1, Long Beach, California.

Jennings, R. D.

1985 Biochemical Variation of the Desert Tortoise, *Gopherus agassizii.* M.S. thesis, University of New Mexico, Albuquerque.

Kaiser Steel Corporation
1978 Surface Mining Reclamation Plan Eagle Mountain Mine. Available from Kaiser Steel Resources (successor), Rancho Cucamonga, California.

Kaiser Steel Resources, Inc.
1990 Amendment to Reclamation Plan No. 107, Eagle Mountain Iron Ore Mine, Riverside, California. September.

Karl, A. E.
n.d. Investigations of the Desert Tortoise at the California Department of Health Services Proposed Low-Level Radioactive Waste Facility Site in Ward Valley, California. U.S. Ecology Report, Sanger, California.

Koehler, J. H., and M. J. Mallory
1981 Addendum to Sources of Power Plant Cooling Water in the Desert Area of Southern California. U.S. Geological Survey Open File Report 81-527.

Kunkel, Fred
1963 Hydrologic and Geologic Reconnaissance of Pinto Basin, Joshua Tree National Monument, Riverside, California. U.S. Geological Survey Water Supply Paper No. 1475-0.

Labys, W. C.
1990 *Market Structure, Bargaining Power, and Resource Price Formation.* Lexington Books, D. C. Heath and Company.

Los Angeles, City of, County of Los Angeles, and Los Angeles Sanitation District
1988 Solid Waste Management Status and Disposal Options in Los Angeles County. Los Angeles Bureau of Sanitation and County Department of Public Works. January.

Mann, J. F., Jr.
1986 Ground Water Conditions in the Eagle Mountain Area. Report submitted to Kaiser Steel Corporation.

Moratto, Michael J.
1984 *California Archaeology.* Academic Press, San Diego.

Morton, P. K.
1991 Mineral Potential Evaluation Regarding Lands Proposed to Be Traded by the Bureau of Land Management to Kaiser Steel Resources, Inc. Prepared for U.S. Bureau of Land Management. April.

Nagy, K. A., and P. A. Medica
1986 Physiological Ecology of Desert Tortoises in Southern Nevada. *Herp.* 42(1):73-92.

Nicol, Kim
1989 Personal communication. California Department of Fish and Game, Region 5. November.

Peterson, A. T.
1990 Birds of Eagle Mountain, Joshua Tree National Monument, California. *Western Birds* 21:127-135.

RECON
1990 Short-term Habitat Conservation Plan for the Desert Tortoise in Clark County, Nevada. San Diego.

Riverside, County of
1987 Comprehensive General Plan.

1989a Solid Waste Management Plan, Tri-Annual Revision, amended July.

Schaefer-Dixon Associates, Inc.
1989b Memorandum of Understanding between the County of Riverside and Mine Reclamation Corporation.

1989 EIR: Preliminary Geotechnical Evaluation, Eagle Mountain Mine, Proposed Class III Landfill, Riverside County. November.

1991 Eagle Mountain Landfill Specific Plan (not yet approved).

Schaefer, Jerry, Ph.D.
1985 Late Prehistoric Adaptations During the Final Recessions of Lake Cahuilla: Fish Camps and Quarries on West Mesa, Imperial County, California. Mooney-Lettieri and Associates.

1988 Lowland Patayan Adaptations to Ephemeral Alkali Pans at Superstition Mountain, West Mesa, Imperial County, California. Brian F. Mooney Associates.

Schaefer, Jerry, Ph.D., Lowell J. Bean, Ph.D., and C. Michael Elling
1987 Settlement and Subsistence at San Sebastian: A Desert Oasis on San Felipe Creek, Imperial County, California. Brian F. Mooney Associates.

Schwartz, O. A., V. C. Bleich, and S. A. Holl

1986 Genetics and the Conservation of Mountain Sheep *Ovis canadensis nelsoni. Biological Conservation* 37:179-190.

SCS Engineers

1987 Municipal Landfill Gas Condensate. Draft Report. EPA Contract No. 68-02-3993. Environmental Protection Agency, Reston, Virginia. April.

1988a Suitability of Tailing Pond Sediments as Landfill Liner, Eagle Mountain Iron Mine, Riverside County, California. May.

1988b Background Water Quality Monitoring Plan, Eagle Mountain Iron Mine, Riverside County, California. October.

1989a Additional Investigations of Tailing Pond Material, Eagle Mountain Iron Mine, Riverside County, California. July.

1989b First Quarterly Background Ground Water Quality Report, Eagle Mountain. September.

1989c Second Quarterly Background Ground Water Quality Report, Eagle Mountain. December.

1989d Memo to Mine Reclamation Corporation regarding calculations of aquifer parameters based on available data. December 22.

1990 Background Ground Water Quality Monitoring Program, Eagle Mountain. May.

Signal Environmental Systems, Inc.

1985 San Diego Energy Recovery Project.

South Coast Air Quality Management District

1980 A Climatological-Air Quality Profile, California South Coast Air Basin. November.

Southern California Association of Governments (SCAG)

1980 Census Tract Data for Riverside County.

1988 The Feasibility of Hauling Solid Waste by Railroad from the San Gabriel Valley to Remote Disposal Sites. Los Angeles. April 21.

Spang, E. F., G. W. Lamb, F. Rowley, W. H. Radtkey, R. R. Olendorff, E. A. Dahlem, and S. Slone

1988 Desert Tortoise Habitat Management on Public Lands: A Rangewide Plan. Division of Wildlife and Fisheries, Bureau of Land Management, Washington, D.C.

Stearns, R. P., and G. Petoyan

1984 Treating Subsurface Landfill Fires. In *Waste Age,* pp. 46-52, March.

Thornthwaite, C. W., and J. R. Mather

1957 Instructions and Tables for Computing Potential Evapotranspiration and Water Balance. *Publications in Climatology 10(3).* Drexel Institute of Technology Laboratory of Climatology, Centerton, New Jersey.

Transportation Policy Associates

1988 *Transportation in America.* Washington, D.C.

Turner, F. B., P. Hayden, B. L. Burge, and J. B. Roberson

1986 Egg Production by the Desert Tortoise (*Gopherus agassizii*) in California. *Herp.* 42(1):93-104.

U.S. Department of the Interior

1986 Case Incident Record, Joshua Tree National Park, Wildlife Sheep Survey. National Park Service.

U.S. Department of Transportation

1988a Annual Accident and Incident Bulletin. Washington, D.C.

1988b Transportation Safety Information Report, 1987 Annual Summary. Washington, D.C.

U.S. Environmental Protection Agency

n.d. The Hydrologic Evaluation of Landfill Performance (HELP) Model Ver. 1. Prepared by P. R. Schroeder, J. M. Morgan, T. M. Walski, and A. C. Gibson, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

U.S. Government National Archives and Records Service

1989 *Code of Federal Regulations* (revised). Washington, D.C.

Weaver, Dick

1990 Personal communication. February 8.

Wesnousky, Steven G.
1986 Earthquakes, Quaternary Faults and Seismic Hazards in California. *Journal of Geophysical Research* 91:12587-12631.

Williams, D. F.
1986 Mammalian Species of Special Concern in California. State of California, Resources Agency, California Department of Fish and Game. Wildlife Management Div. Ad. Rep. 86-1.

Withycombe, E.
1991 Personal communication. Sierra Research, Sacramento. March 6.

Woodward-Clyde Associates
n.d. Plant Site to Victorville/Lugo Devers to Victorville/Lugo. Phase 1 Regional Study. Prepared for Wirth Associates.

Wyle Laboratories
1973 *Assessment of Noise Environments Around Railroad Operations.* Wyle Laboratories Report WCR 73-5. July.

X. Glossary of Terms and Acronyms

AB: Assembly Bill

ACEC: Area of Critical Environmental Concern

ACHP: Advisory Council on Historic Preservation

Acre-foot: Volume of liquid or solid required to cover one acre to a depth of one foot.

Active fault: Fault with recent enough seismic activity as to have displaced materials not more than 12,000 years old.

Alluvium: A general term for deposits made by streams, river beds, or floodplains. A deposit of silt or silty clay laid down during time of flood.

Ambient noise: A mix of all the existing sounds within a given location; i.e., background noise.

ANDOS: Areas Not Designated as Open Space

Aquifer: A geological formation that is sufficiently permeable to conduct groundwater and to yield significant quantities of water to wells and springs.

ARB: Air Resources Board (State of California)

Area of Critical Environmental Concern (ACEC): Area where special management is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes.

Artificial fill: Human-made deposits of soil, rock, tailings, and the like.

Authority to Construct: Written permit pursuant to Rule 201, Regulation II, of the South Coast Air Quality Management District which must be obtained from the Air Pollution Control District prior to the construction, alteration, or replacement of any article, machine, or equipment which may emit air contaminants or affect in any way the emission of those contaminants.

BACT: Best available control technology

Baseline groundwater monitoring: Measure of groundwater quality prior to initiating a project for the purpose of having a standard for future comparisons.

Bedrock: The solid rock that underlies other superficial material.

Biological oxygen demand (BOD): A measure of wastewater strength. The amount of oxygen required by bacteria to decompose organic matter in a water sample under aerobic conditions at 20 degrees Centigrade over a five-day incubation period.

British thermal unit (Btu): A measure of energy. The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit at a specified temperature.

BLM: Bureau of Land Management

B.P.: Before the present

Caliche: Gravel, sand, or desert debris cemented by porous calcium carbonate.

California Desert Conservation Area (CDCA) Plan: BLM program pursuant to the FLPMA of 1976 (Section 601) which provides for the proper use of desert public lands and resources while safeguarding the environmental, cultural, and aesthetic values.

CCR: California Code of Regulations

California Endangered Species Act: 1984 legislation which intends to protect floral and faunal species by listing them as "rare," "threatened," "endangered," or "candidate" and providing a consultation process for the determination and resolution of potential adverse impact to the species.

California Environmental Quality Act (CEQA): Policies enacted in 1970, and subsequently amended, the intent of which is the maintenance of a quality environment for the people of California now and in the future.

Category IV Outlying Area: Area characterized as "self-sufficient" in terms of public services, with basic road improvements, low residential densities, limited convenience commercial services, and potential for resource production and waste disposal as considered appropriate.

CCR: California Code of Regulations

CDFG: California Department of Fish and Game

Cenozoic era: Geologic time span comprising both the Tertiary and the Quaternary periods (65 million years ago to the present).

CFR: Code of Federal Regulations

Chemical oxygen demand (COD): The amount of oxygen required for the oxidation of the organic matter in a water sample. An indication of the quantity of organic matter present in the sample.

CIWMB: California Integrated Waste Management Board

Class I area: National park, national wilderness area, or national monument which meets one or more clean air standards and which must be protected against significant deterioration caused by pollutants.

Class III landfill: Facility which allows only the disposal of "nonhazardous municipal solid waste and construction debris waste."

cm/sec: centimeters per second

CNEL: Community Noise Equivalent Level

CO: Carbon monoxide

COD: Chemical oxygen demand

CoSWMP: County Solid Waste Management Plan

County Services Area (CSA) 51: Area in eastern Riverside County near the project location which includes the towns of Eagle Mountain, Desert Center, and Lake Tamarisk. These communities receive monies from the County general fund to pay for roads, water, and sewer.

Cretaceous period: Geologic time approximately 135 million years ago (compare Mesozoic era).

CRIT: Colorado River Indian Tribes

Crystalline rock: A rock consisting of minerals in an obvious crystalline state. Inexact synonym for "igneous and metamorphic rock" as opposed to "sedimentary."

cu ft/lb-yr: Cubic feet per pound per year

dBA: A-weighted decibel; decibel weighted to reflect sounds most sensitive to human ears.

Desert Area: Designation under the Land Use Determination System which allows for open space and limited recreational uses, single-family residences (one dwelling unit per lot), landfills, compatible resource development, and governmental uses in lots of 10 acres in size.

Discretionary actions: Conditions which can be imposed on a project action prior to approval for implementation. The approval would thus be "at the discretion" of an agency.

DOI: Department of the Interior (United States)

EIR: Environmental impact report

EIS: Environmental impact statement

EMEC: Eagle Mountain Energy Company

EMT: Emergency medical technician

Endangered species: A species with its prospects of survival and reproduction in immediate jeopardy from one or more causes.

Environmental impact report (EIR): Document in which the impacts of any state or local, public or private project action which may have a significant environmental effect are evaluated prior to its construction or implementation, as required by the California Environmental Quality Act.

Environmental impact statement (EIS): Document prepared to evaluate the environmental effects of a project which requires federal review under the National Environmental Policy Act.

Eocene epoch: Geologic time within the Tertiary period corresponding to approximately 55 million years ago.

EPA: Environmental Protection Agency

Extrusive rock: Igneous rock that has erupted onto the surface of the earth.

Federal Drinking Water Standards: Primary water standards. Criteria set in 1962 by the U.S. Public Health Service which is used in determining the suitability of a water for drinking and culinary purposes. The standards establish mandatory limits of maximum permissible concentration for certain chemical constituents and nonmandatory but recommended limits for others.

Fault: A fracture or fracture zone along which there has been displacement of the sides relative to one another.

FERC: Federal Energy Regulatory Commission

FHWA: Federal Highway Administration

FLPMA: Federal Land Policy and Management Act

Fluviatile sediments: Sediments produced by river action.

Fossil fuel: Petroleum, natural gas, or coal. A general term for any hydrocarbon that may be used as fuel.

Green waste compost: A mixture of decaying organic solid waste matter used as fertilizer.

Groundwater basin: Underground formation with sides and bottom of relatively impervious material in which groundwater is held or retained. Aquifer or system of aquifers with well-defined boundaries.

Groundwater gradient: The slope of the profile of the water table under unconfined groundwater conditions, or the slope of the imaginary surface to which groundwater rises due to hydrostatic pressure under confined conditions (wells and springs).

HDPE: High density polyethylene

HMA: Habitat Management Area.

Habitat area categories: System used to indicate level of importance for wildlife habitat management considerations; Category 1 designates the most important areas and Category 3 the least.

Hazard index: A measure of how hazardous a railroad crossing is relative to others, rather than an absolute measure of risk.

Hazardous material: Substance which, because of its potential for either corrosivity, toxicity, ignitability, chemical reactivity, or explosiveness, may cause injury to persons or damage to property.

HCP: Habitat conservation plan

Holocene, or Recent, epoch: Geologic time within the Quaternary period from approximately 12,000 years ago to the present time.

Igneous rock: Rock that resulted from the solidification of molten or partly molten material.

Intrusive rock: Rock which has been injected into the earth under pressure.

JTNM: Joshua Tree National Monument

KOP: Key observation point

Lacustrine sediments: Sediments produced by lake action.

Landfill condensate: Liquid from the landfill gas which results from the temperature decline the gas goes through during collection.

Landfill cover: Low-permeability compacted soil placed over completed sections of a landfill to minimize percolation of surface waters through the refuse and to prevent scavenging.

Landfill gas (LFG): Gas produced as part of the biological decomposition of the organic matter present in solid wastes; methane is the principal component of this gas.

Landfill leachate: Liquid resulting from the contact of water with the decomposing waste of a landfill and which now contains dissolved waste materials.

Landfill liner: Layer of low-permeability soil (clay) applied to the bottom of the landfill to direct leachate to the leachate collection system and minimize leakage in cases of leachate production.

Land Use Determination System: A four-step process established by the Riverside County Comprehensive General Plan for the identification of the appropriate land uses depending on the location of a particular site.

LEA: Local Enforcement Agency

Local Enforcement Agency (LEA): The Riverside County Department of Health is the LEA acting for the California Integrated Waste Management Board. It will issue the County solid waste facilities permit.

L_{eq}: Equivalent noise level

Level of Service (LOS): An indicator of traffic conditions at an intersection or on a stretch of roadway, and of the delay that can be expected in the general area; A is the best (no delay) and F is the worst.

LFG: Landfill gas

L50: Noise level exceeded 50 percent of the time

L_{max}: Maximum noise level

LOS: Level of Service

Magma: Naturally occurring molten rock material.

Mesozoic era: Geologic time span comprising the Triassic, Jurassic, and Cretaceous periods (230 to 135 million years ago).

Metamorphic rock: Any rock derived from preexisting rocks in response to marked changes in temperature, pressure, stress, etc.

mg/kg: milligrams per kilogram

mg/l: milligrams per liter

Mineral Resources Area: Designation under the Land Use Determination System which allows for mineral production and compatible and related uses with a minimum lot size of 20 acres.

Mining reclamation plan: Restoration effort whereby equipment, homes, offices, and other structures are removed from the quarrying site and improvements are effected to stabilize surfaces and allow natural revegetation to occur.

Miocene epoch: Geologic time within the Tertiary period corresponding to approximately 20 million years ago.

MMBtu: Million British thermal units

mmcfd: Million cubic feet per day

MOU: Memorandum of Understanding

Mountainous Area: Designation under the Land Use Determination System which identifies an area with slopes in excess of 25 percent, with no county road access or community water system, and which allows for open space and limited recreational uses, single-family residences (one dwelling unit per lot), landfills, compatible resource development, and governmental uses in lots of 10 acres in size.

MPH: Miles per hour

MRC: Mine Reclamation Corporation

MRF: Materials recovery facilities

MSHA: Mine Safety and Health Act

MSHCP: Multiple Species Habitat Conservation Plan

MSL: Mean sea level

Multiple Use Class C (Controlled Use): CDCA Plan designation for an area where grazing, vehicle access, and most types of facility development are restricted.

Multiple Use Class I (Intensive Use): CDCA Plan designation for an area which allows for the concentrated use of lands and resources for human needs, but with reasonable protection for sensitive natural and cultural values and mitigation and rehabilitation whenever and wherever possible.

Multiple Use Class L (Limited Use): CDCA Plan designation for an area managed for generally low-intensity, carefully controlled multiple use of resources while ensuring that sensitive values are not significantly diminished.

Multiple Use Class M (Moderate Use): CDCA Plan designation for an area that allows for "a controlled balance" between low- and high-intensity uses while providing for activities such as mining, livestock grazing, recreation, and energy and utility development.

MW: Megawatt

MWD: Metropolitan Water District

NAAQS: National ambient air quality standards

National Environmental Policy Act (NEPA): 1969 federal legislation which encourages restoration and maintenance of environmental quality to the overall welfare of living things.

National Register of Historic Places: A list of significant historic and prehistoric sites and districts which provides procedural protection of these properties.

NEPA: National Environmental Policy Act

NHPA: National Historic Preservation Act

NMHC: Non-methane hydrocarbons

NO: Nitric oxide

NOP: Notice of Preparation

NORA: Notice of a Realty Action

Notice of Preparation (NOP): A brief notice sent by the public agency with principal responsibility for carrying out or approving a project to notify other agencies that an EIR is being prepared.

NO_2: Nitrogen dioxide

NO_x: Nitrogen oxides

NPS: National Park Service

OPR: Office of Planning and Research (State of California)

OSHA: Occupational Safety and Health Act

O_3: Ozone

Ozone (O_3): An end product of complex reactions between reactive organic gases (or non-methane hydrocarbons) and nitrogen oxides (NO_x) in the presence of intense ultraviolet radiation.

Packer truck: A vehicle used for trash collection which hydraulically compacts the refuse as it is picked up.

Paleozoic era: Geologic time span from 600 to 230 million years ago.

PCBs: Polychlorinated biphenyls

Permeability: The capacity of porous rock, sediment, or soil for transmitting a fluid.

Permit to Operate: Written permit pursuant to Rule 203, Regulation II, of the SCAQMD which must be obtained from the Air Pollution Control District before the article, machine, or contrivance subject to an Authority to Construct is put into operation.

pH: Measure of acidity; the logarithm to the base 10 of the reciprocal of the H+ concentration ([H+]), i.e., the negative logarithm of the [H+].

Photolineaments: Faults observable from aerial photographs.

Pleistocene epoch: Geologic time within the Quaternary period corresponding to approximately 600,000 years ago.

Pliocene epoch: Geologic time within the Tertiary period corresponding to approximately 10 million years ago.

PM10: 10-micron particulate matter

ppm: Parts per million

Precambrian era: Geologic time span 4.5 to 2 billion years ago.

PSD: Prevention of Significant Deterioration

PUC: Public Utilities Commission

Quaternary period: Geologic time span comprising both the Pleistocene and Holocene epochs (600,000 years ago to the present).

Rare species: A species which, although not presently threatened with extinction, is in such small numbers throughout its range that it may become endangered if its present environment worsens.

RC district: Resource Conservation district

RCRA: Resource Conservation and Recovery Act

Regional Water Quality Control Board (RWQCB): Agency which administers the requirements of the California Administrative Code, Title 23, Division 3, Chapter 15 (Section 2595,g,7) to ensure the highest possible water quality consistent with all demands.

Responsible agency: The organization that has the legal duty to ensure that developers comply with the appropriate rules and regulations.

Right-of-way: The right to pass over property owned by another. The strip of land over which facilities such as roadways, railroads, or power lines are built.

ROD: Record of Decision

ROG: Reactive organic gases

RTCF: Return-to-custody facility

RWQCB: Regional Water Quality Control Board

SANDER: San Diego Energy Recovery Project

SBM: San Bernardino meridian

SCAB: South Coast Air Basin.

SCAG: Southern California Association of Governments

SCAQMD: South Coast Air Quality Management District

SCE: Southern California Edison

SCGC: Southern California Gas Company

Section 1603 Streambed Alteration Agreement: California Department of Fish and Game policy which regulates alteration to streambeds in order to protect fish and wildlife resources.

Section 404 permit: Provision of the Clean Water Act which regulates the amount of fill material that can be placed within defined navigable waterways or wetlands in the United States, especially if federally listed species are involved; issued by the U.S. Army Corps of Engineers.

Section 7 consultation: A requirement of the federal Endangered Species Act which requires formal consultation with the U.S. Fish and Wildlife Service if an action or project may result in impacts to an endangered species.

SEDAB: Southeast Desert Air Basin

Seismicity: The likelihood of an area being subject to earthquakes.

Sensitive species: Generic term for any plant or animal species which is recognized by the government or by any conservation group as being depleted, rare, threatened, or endangered.

Sewage: Wastewater carried by community sewer systems. As defined in Section 13005 of the California Water Code, "any and all waste substance, liquid or solid, associated with human habitation, or which contains or may be contaminated with human or animal body wastes."

Significant environmental impact: As defined by CEQA, Chapter 3, Article 1, Section 15002 (g), "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project."

Silt: Mud or fine earth suspended in water.

Source reduction: In this context, measures to reduce the amount or types of municipal solid waste generated.

South Coast Air Quality Management District (SCAQMD): The air quality regulatory agency for the entire South Coast Air Basin.

SO_2: Sulfur dioxide

SOx: Sulfur oxides

SP: Specific plan

Specific plan area: The extent of a detailed land use plan which is intended to implement the Comprehensive General Plan in the designated area. The specific plan incorporates and establishes land use policies and standards for activities and facilities under California Government Code Section 65450 et seq. and the County General Plan.

SWRCB: State Water Resources Control Board

Tertiary period: Geologic time span comprising the Paleocene, Eocene, Oligocene, Miocene, and Pliocene epochs (65 to 10 million years ago).

Threatened species: Species which, although not presently threatened with extinction, is likely to become endangered in the foreseeable future in the absence of special protection and management efforts.

Tipper: A stationary platform which elevates a trailer so that its refuse is discharged from the rear of the trailer.

TOC: Total organic carbon

Total dissolved solids (TDS): The dry residue from the dissolved matter in a water sample that remains after the sample has evaporated. The TDS serve as an indicator of the chemical quality of waters.

TOX: Total organic halides

tpd: Tons per day

tpy: Tons per year

TSP: Total suspended particulates

USACE: United States Army Corps of Engineers

USFWS: United States Fish and Wildlife Service

U.S.G.S.: United States Geological Survey

VEBA: Volunteer Employee Benefit Association

Vector: A carrier capable of transmitting disease-causing organisms.

Vehicle delay: Cumulative amount of time vehicles are delayed at a railroad crossing. This delay is a function of the length of time the crossing is blocked by a train and of the arrival and departure rate per minute for each vehicle stopped at the crossing. Thus, if 60 vehicles are delayed for 1 minute, the vehicle delay for the crossing is said to be 60 minutes.

VHD: Vehicle hour of delay

Visual Resource Management (VRM) System: BLM's method of assessing visual resources by defining landscape character and scenic quality.

VOC: Volatile organic compound

Volatile organic compound (VOC): Any organic compound having a vapor pressure greater than 3.0 pounds per square inch as determined by the methods of the American Society of Testing and Materials.

VRM System: Visual Resource Management System

Watershed: A region bounded by a narrow tract of high ground which divides the flow of surface waters. A region that contributes water to a particular stream channel or system of channels.

Water table: The upper water level of a body of groundwater.

Waste discharge requirements: Regulation described in Title 23, Division 3, Chapter 15, of the California Code of Regulations which governs discharge of wastes to land in order to preserve the quality of the state's surface and groundwaters.

Waste inspection facility: A place located in either the Phase I or II container handling yard used to inspect and sort loads of waste generated locally (which are not processed through transfer stations) to remove hazardous materials.

Waste stream: The total sum of waste materials present from origin to disposal.

Wilderness Study Area (WSA): Parcel of public land that has been found to possess the basic wilderness characteristics identified by Congress in the Wilderness Act of 1964; namely, naturalness, outstanding opportunities for solitude or for primitive or unconfined types of recreation, size of at least 5,000 acres, and appearance of having been affected primarily by forces of nature.

Working face: Portion of the landfill where solid wastes are presently being discharged.

WSA: Wilderness Study Area

XI. Index

J

K

L

M

S

T

DEPARTMENT OF THE INTERIOR

COUNTY OF RIVERSIDE

4726
v1/2

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

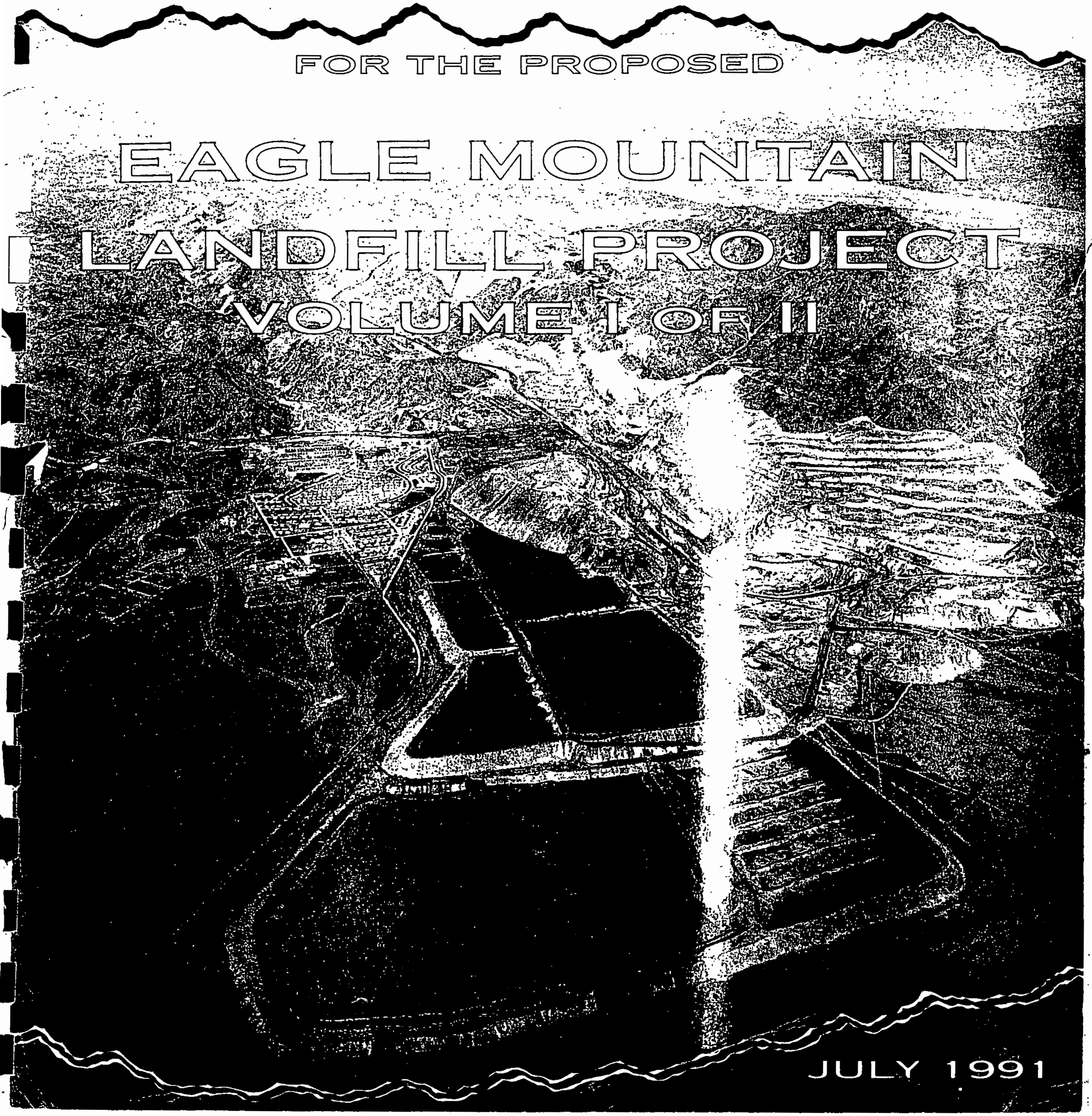
Bureau of Land Management

COUNTY OF RIVERSIDE
MAY 9, 1893

Planning Department

APPENDIXES
TO THE
DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT

FOR THE PROPOSED



EAGLE MOUNTAIN LANDFILL PROJECT
VOLUME I OF II

JULY 1991

Appendixes to the Draft Environmental Impact Statement/ Environmental Impact Report for the Eagle Mountain Landfill Project (Volume I of II)

Prepared for

MINE RECLAMATION CORPORATION
3179 TEMPLE AVENUE, SUITE 290
POMONA, CA 91768

Prepared by

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON Number 2100E
June 10, 1991

This document printed on recycled paper.

Appendixes Volume I

A: Notice of Preparation Materials & List of Persons Receiving Draft EIS/EIR
B: Project Description
C: Water Quality Data
D: Draft Traffic Analysis

APPENDIX A

4

Notices of Preparation and Intent

The project proposes to establish several waste transfer stations within the Los Angeles metropolitan area, and possibly others in the Southern California region. Because specific locations have not yet been established, this project will not specifically address the waste transfer stations. Furthermore, any contemplated transfer stations will require review and approval by that individual city or county which has jurisdiction over that particular station's location. It is proposed that transport of the waste material will be via Southern Pacific rail routes throughout Southern California. At this time it is infeasible to determine which rail routes will be used, since the location of the transfer stations have not been finalized, and additional stations could be added later.

Pursuant to the Riverside County Rules to Implement the California Environmental Quality Act, notice is given to responsible and interested agencies, that the Riverside County Planning Department plans to oversee the preparation of an Environmental Impact Report for the project. The purpose of this notice is to solicit guidance from your agency as to the scope and content of the environmental information to be included in the EIR. Information in that regard should be submitted to this office as soon as possible, but not later that 30 days after receiving this notice.

Attached is a copy of the issues to be included in the draft EIR. If you have any questions, please contact David Mares, Project Planner, at (714) 787-2140.

Very truly yours,

RIVERSIDE COUNTY PLANNING DEPARTMENT
Roger S. Streeter, Planning Director

David Mares

David Mares, Planner III

CORRECTED
AGENCY NOTICE OF PREPARATION
OF
AN ENVIRONMENTAL IMPACT REPORT

DATE: August 15, 1989

TO:

PROJECT CASE NO./TITLE:

Specific Plan No. 252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 209/Eagle Mountain Project.

PROJECT SPONSOR:

Mine Reclamation Corporation
550 N. Brand Blvd. 8th Floor
Glendale, CA. 91203

PROJECT DESCRIPTION:

A proposed regional Class III solid waste disposal site (sanitary landfill) combined with the storage, fabrication and sales of recyclable material; the repair and maintenance of railroad equipment, facilities, and rail cars used to transport waste to the site, landfill gas recovery and utilization, composting, leachate processing, renewal of mining operations, the continuance and/or expansion of existing residential and commercial land uses, and the continuance and/or expansion of the Return-to-Custody facility.

Collection of waste material is to occur primarily within the Los Angeles metropolitan area, at waste transfer station locations not yet determined; with other possible locations situated in the Southern California region. Transport of waste material is proposed to occur along various Southern Pacific rail routes throughout Southern California, and will be dependant on the location of the transfer station. It is anticipated that the disposal site, when operating at maximum operational capacity, will receive six (6) trains daily.

PROJECT LOCATION:

Portions of the Western and Central Chuckwalla Zoning Area located approximately 10 miles northwest of the community of Desert Center and approximately 1/4 mile south of Joshua Tree National Monument. The site covers, approximately 9,800 acres within the Eagle Mountains, and was previously known as the Kaiser Eagle Mountain Iron Mine.

.....COUNTY OF SAN BERNARDINO
108 CITY OF CHINO
109 CITY OF COLTON
110 CITY OF FONTANA
111 CITY OF GRAND TERRACE
112 CITY OF LOMA LINDA
113 CITY OF MONTCLAIR
114 CITY OF ONTARIO
115 CITY OF RANCHO CUCAMONGA
116 CITY OF REDLANDS
117 CITY OF RIALTO
118 CITY OF SAN BERNARDINO
119 CITY OF UPLAND

.....COUNTY OF ORANGE
120 CITY OF ANAHEIM
121 CITY OF BREA
122 CITY OF BUENA PARK
123 CITY OF COSTA MESA
124 CITY OF CYPRESS
125 CITY OF FULLERTON
126 CITY OF GARDEN GROVE
127 CITY OF HUNTINGTON BEACH
128 CITY OF LA HABRA
129 CITY OF LOS ALAMITOS
130 CITY OF ORANGE
131 CITY OF SANTA ANA
132 CITY OF STANTON
133 CITY OF TUSTIN
134 CITY OF VILLA PARK
135 CITY OF WESTMINSTER

.....COUNTY OF IMPERIAL
136 CITY OF BRAWLEY
137 CITY OF CALIPATRIA
138 CITY OF EL CENTRO
139 CITY OF IMPERIAL

.....COUNTY OF RIVERSIDE
140 CITY OF BANNING
141 CITY OF BEAUMONT
142 CITY OF CATHEDRAL CITY
143 CITY OF COACHELLA
144 CITY OF INDIO
145 CITY OF PALM DESERT
146 CITY OF PALM SPRINGS
147 CITY OF RANCHO MIRAGE
148 CITY OF RIVERSIDE
149 DESERT CENTER UNIFIED SCHOOL DISTRICT
150 AGUA CALIENTE TRIBAL OFFICE
151 AUDOBON SOCIETY
152 CARMICHAEL, S
153 COACHELLA VALLEY WATER DISTRICT
154 COUNTY SERVICE AREA #51
155 DESERT WATER AGENCY
156 GENERAL TELEPHONE
157 HARLOW, DAVE H.-EAST AREA PLANNING COUNCIL
158 JOSHUA TREE NATIONAL MONUMENT
159 LAKE TAMARISK BRANCH PUBLIC LIBRARY
160 METROPOLITAN WATER DISTRICT
161 MISSION SPRINGS WATER DISTRICT
162 SAN BERNARDINO MUSUEM-B. REYNOLDS (PALEO)
163 SIERRA CLUB-SAN GORGONIO CHAPTER
164 SO. CAL. EDISON
165 SO. CAL. GAS COMPANY
166 SO. COACHELLA VALLEY COMMUNITY SERVICES DIST.
167 SOUTHERN PACIFIC RAILROAD
168 THE NATURE CONSERVANCY
169 UCR-ARCHAEOLOGICAL RESEARCH UNIT, D. McCARTHY
170 UCR-LIFE SCIENCE DEPT. W.W. MAYHEW
171 COUNTY OF SAN BERNARDINO
172 COUNTY OF LOS ANGELES
173 COUNTY OF IMPERIAL
174 COUNTY OF ORANGE
175 COUNTY OF SAN DIEGO

LIST OF AGENCIES FOR N.O.P. FOR SP 252 (AGENCY FORMAT)

1 CENICEROS, KAY -4th DIST. SUPERVISOR

2 BEADLING, ELIZABETH- 4th DIST. PLANNING COMMISSIONER

3 STATE CLEARINGHOUSE
4 STATE AIR RESOURCES BOARD
5 STATE DEPT. OF FISH & GAME-LONG BEACH OFFICE
6 STATE DEPT. OF HEALTH SERVICES
7 STATE DEPT. OF CONSERVATION
8 HIGHWAY PATROL
9 STATE OFFICE OF PLANNING AND RESEARCH
10 STATE DEPT. OF CORRECTIONS
11 STATE DEPT. OF RESOURCES
12 STATE DIVISION OF MINES AND GEOLOGY
13 STATE LAND RESOURCES PROTECTION UNIT
14 STATE LANDS COMMISSION-SACRAMENTO OFFICE
15 STATE LANDS COMMISSION-LONG BEACH OFFICE, G. PELKA
16 STATE PUBLIC UTILITIES COMMISSION
17 STATE RECLAMATION BOARD
18 CALIFORNIA WASTE MANAGEMENT BOARD
19 CALTRANS-DISTRICT #11
20 CALTRANS-DISTRICT #6

21 REGIONAL WATER QUALITY CONTROL BOARD #7(COLORADO)
22 COACHELLA VALLEY ASSOC. OF GOVTS. (CVAG)
23 SO. COAST AIR QUALITY MANAGEMENT DISTRICT

24 GROFIT
25 RIV. CO. ADMINISTRATION OFFICE
26 RIV. CO. ASSESSORS OFFICE
27 RIV. CO. BUILDING & SAFETY DEPT.
28 RIV. CO. DEPT. OF ECONOMIC AND COMM. DEV.
29 RIV. CO. FIRE DEPT.-PLANNING & ENGINEERING
30 RIV. CO. FLOOD CONTROL
31 RIV. CO. HEALTH DEPT.
32 RIV. CO. OPEN SPACE RESOURCE COMMISSION
33 RIV. CO. PARKS DEPT.
34 RIV. CO. PUBLIC LIBRARY
35 RIV. CO. ROAD DEPT.
36 RIV. CO. SHERIFF DEPT.
37 RIV. CO. WASTE MANAGEMENT DEPT.

38 U.S. BUREAU OF LAND MANAGEMENT
39 U.S. BUREAU OF MINES (div. of dept. of interior)
40 U.S. DEPT. OF FISH AND WILDLIFE
41 U.S. DEPT. OF FOOD AND AGRICULTURE
42 U.S. DEPT. OF THE INTERIOR
43 U.S. POSTAL SERVICE
44 U.S. SOIL CONSERVATION DIST. COACHELLA VALLEY
45 ENVIRONMENTAL PROTECTION AGENCY
46 U.S. DEPT. OF THE ARMY

.....COUNTY OF SAN DIEGO
47 CITY OF CHULA VISTA
48 CITY OF EL CAJON
49 CITY OF LA MESA
50 CITY OF LEMON GROVE
51 CITY OF NATIONAL CITY
52 CITY OF SAN DIEGO

.....COUNTY OF LOS ANGELES
53 CITY OF ALHAMBRA
54 CITY OF ARTESIA
55 CITY OF AZUSA
56 CITY OF BALDWIN PARK
57 CITY OF BELL
58 CITY OF BELL GARDENS
59 CITY OF BELLFLOWER
60 CITY OF BURBANK
61 CITY OF CARSON
62 CITY OF CERRITOS
63 CITY OF CLAREMONT
64 CITY OF COMMERCE
65 CITY OF COMPTON
66 CITY OF COVINA
67 CITY OF CULVER CITY
68 CITY OF DOWNEY
69 CITY OF EL MONTE
70 CITY OF EL SEGUNDO
71 CITY OF GARDENA
72 CITY OF GLENDALE
73 CITY OF HAWTHORNE
74 CITY OF HUNTINGTON PARK
75 CITY OF INDUSTRY
76 CITY OF IRWINDALE
77 CITY OF LA MIRADA
78 CITY OF LA PUENTE
79 CITY OF LA VERNE
80 CITY OF LANCASTER
81 CITY OF LONG BEACH
82 CITY OF LOS ANGELES
83 CITY OF LYNWOOD
84 CITY OF MAYWOOD
85 CITY OF MONTEBELLO
86 CITY OF MONTEREY PARK
87 CITY OF NORWALK
88 CITY OF PALMDALE
89 CITY OF PARAMOUNT
90 CITY OF PICO RIVERA
91 CITY OF POMONA
92 CITY OF REDONDO BEACH
93 CITY OF ROSEMEAD
94 CITY OF SAN DIMAS
95 CITY OF SAN FERNANDO
96 CITY OF SAN GABRIEL
97 CITY OF SANTA CLARITA
98 CITY OF SANTA FE SPRINGS
99 CITY OF SANTA MONICA
100 CITY OF SIGNAL HILL
101 CITY OF SOUTH GATE
102 CITY OF TEMPLE CITY
103 CITY OF TORRANCE
104 CITY OF VERNON
105 CITY OF WALNUT
106 CITY OF WEST COVINA
107 CITY OF WHITTIER

enhance relationships between local consumers and FDA's district offices, and to contribute to the agency's policymaking decisions on vital issues.

Dated: November 7, 1989.

Ronald G. Chesemore,

Acting Associate Commissioner for Regulatory Affairs.

[FR Doc. 89-26774 Filed 11-14-89; 8:45 am]

BILLING CODE 4160-01-M

Health Care Financing Administration

Statement of Organization, Functions, and Delegations of Authority

Part F. of the Statement of Organization, Functions, and Delegations of Authority for the Department of Health and Human Services, Health Care Financing Administration (HCFA), (Federal Register, Vol. 53, No. 45, pg. 7403, dated March 9, 1988) is amended to reflect the addition of responsibility for the Office of Inspector General (OIG) audit resolution functions to the Management Planning and Analysis Staff (MPAS), Office of Budget and Administration (OBA), in the Office of the Associate Administrator for Management.

The specific amendment to Part F. is described below:

- Section FH.20.A.4, Management Planning and Analysis Staff (FHA-1) is amended by deleting the functional statement in its entirety and replacing it with the following functional statement:

4. Management Planning and Analysis Staff (FHA-1)

Assists and advises the Director, Office of Budget and Administration (OBA) and other OBA managers in management analysis activities. Provides Agency-wide services, policy, planning, and control programs including: workplanning, management analysis, quality/productivity improvement, Privacy Act responsibilities, the internal control program, Office of Inspector General (OIG) audit resolution functions, advisory and assistance services certification, contracting out of commercial and industrial activities, the administrative issuances system, and memoranda of understanding and interagency agreements. Develops HCFA Policy in these areas and assures the implementation of these policies throughout HCFA. Conducts special studies and analyses concerning Agency-wide and cross-cutting OBA issues and other broad based administrative issues.

Dated: November 3, 1989.

Robert A. Streimer,

Acting Associate Administrator for Management.

[FR Doc. 89-26823 Filed 11-14-89 8:45 am]

BILLING CODE 4120-01-M

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[CA-060-00-5440-10-ZBBB]

Proposed Right-of-Way and Land Exchange for Proposed Eagle Mountain Mine Waste Disposal Facility

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of intent.

SUMMARY: Notice is hereby given that the Bureau of Land Management (BLM) and the County of Riverside will prepare a joint Federal-County Environmental Impact Report/Statement (EIR/EIS) for a proposed right-of-way and land exchange for Mine Reclamation Corporation's (MRC) proposed waste disposal facility at the Eagle Mountain Mine.

MRC has proposed to utilize Kaiser Steel Resources, Inc.'s (KSR) Eagle Mountain Mine site in Riverside County, California, and an associated railroad spur for a Class III waste disposal facility. The site would also be used for the storage of recyclable materials, rail and equipment maintenance, landfill gas recovery and utilization, flare/energy recovery, leachate processing, wastewater treatment, the continuance and/or expansion of the existing residential and commercial land uses, and the expansion of the Return-to-Custody facility (California Department of Corrections).

DATES: For Scoping Meetings and Comments: Public scoping meetings will be held on the following dates: 7 p.m. on Wednesday, December 6, 1989, at Lake Tamarisk Recreation Center, 26251 Parkview Dr., Desert Center, CA 92239 (619-227-3203); 7 p.m. Thursday, December 7, 1989, at City Hall Palm Desert, 73510 Fred Waring Dr., Palm Desert, CA 92260 (619-346-0611); and 9:00 a.m. Monday, December 11, 1989, at Southern California Association of Governments, 818 W. 7th St., 12th Floor, Conference Room, Los Angeles, CA 90017 (213-236-1800).

Comments are being requested to help identify significant issues or concerns related to the proposed action, to determine the scope of the issues (including alternatives) that need to be analyzed, and to identify and eliminate from detailed study the issues which are not significant. All comments recommending that the EIR/EIS address specific environmental issues should contain supporting documentation and rationale. Written comments must be filed on or before December 20, 1989, reference BLM CA-25594, and should be addressed to Marianne Wetzel, BLM, Palm Springs-South Coast Resource Area, 400 S. Farrell Dr., Suite B-205, Palm Springs, CA 92262.

SUPPLEMENTARY INFORMATION: The project site is the Eagle Mountain inactive, open iron mine located in the Eagle Mountains in eastern Riverside County. The site is owned by KSR and occupies approximately 9,800 acres. The site is located approximately 10 miles north of Desert Center, approximately 170 miles east of Los Angles, and approximately 50 miles west of the Arizona border.

MRC has leased approximately 8,300 acres of the Eagle Mountain Mine and the 52-mile private railroad from KSR for a period of 100 years. MRC proposes to use approximately 5,300 acres of the leased area as a regional site for retrievable storage and disposal of nonharzardous municipal solid waste generated in Southern California. Of the 5,300 acres, about 2,250 acres would be for the landfill itself. Before refuse is delivered to the project site, it will be processed through transfer stations which will be located as near as practicable to the sources of refuse production. At the transfer stations, which will not be owned or operated by MRC, refuse will be screened for harzardous substances, sorted for recyclables, compacted, and loaded into closed shipping containers. MRC plans to have the landfill operating in 1991.

Initially, MRC expects to receive 4,000 tons of waste per day. This waste volume is expected to increases to a maximum of 20,000 tons per day, with 16,000 tons per day being transported by rail and a maximum of 4,000 tons per day being transported by road. The waste would be place in the existing open mining pits at Eagle Mountain Mine. The estimated capacity of the proposed landfill is in excess of 500 million tons and have a minimum life of 100 years.

The project would be developed to meet stringent state and federal regulations for municipal solid waste landfills. The entire area underlying the refuse would be lined with on-site clay-like materials. At no time would refuse be placed upon or against unlined native material. Other pollution control systems to be constructed would include: ground water monitoring wells,

SUMMARY OF POTENTIAL ENVIRONMENTAL IMPACTS FOR SP 252

Earth:	Seismic and groundshaking impacts. Slope stability and potential rockfall impacts. Mineral resource preservation.
Air:	Mobile and stationary source emissions. Odors emanating from the landfill site. Cumulative local and regional effects.
Water:	Flood and storm drainage. Surface water quality. Groundwater quality and quantity. Availability of potable water and sewer capacity.
Biotic:	Description of native fauna and flora species and habitats. Potential introduction of exotic species and potential conflicts with native species.
Noise:	Mobile noise sources from rail and highway. Stationary noise sources from mining and recycling activities. Impacts on noise sensitive localities.
Population:	Potential increases in local population. Growth inducing effects on surrounding communities and public facilities.
Transportation/ Circulation:	Vehicle and rail trip generation. Rail scheduling and coordination issues. Cumulative impacts.
Public Services:	Increase in demand for, and cumulative impacts on public services including, but not limited to, fire protection, law enforcement, road maintenance, and emergency medical services.
Energy Conservation:	Reclamation and recycling of recyclable materials. Use of water-saving and electricity-saving devices in residences and commercial uses.
Utilities:	Increase in demand for, and cumulative impacts on utilities including, but not limited to, electrical, water, sewer, telephone, and natural gas.
Hazardous Waste:	Methods proposed to restrict and prohibit disposal of hazardous substances, materials and waste. Methods of detection of the presence of hazardous materials and emergency response capability.
Public Health/ Safety:	Methods proposed for temporary off site storage of waste materials, in the event of disaster or catastrophe. Subsurface gas migration, subsurface fires. Control of vectors and disease. Rail accident potential, leachate spill, methane explosion and fire.

leachate collection and treatment systems, drainage systems, and landfill gas control and recovery systems.

A portion of the proposed project area including a portion of the railroad was authorized by the BLM for mining use only by KSR. Therefore, owing to the change of use, KSR is applying for the conversion of a legislatively approved railroad right-of-way to a right-of-way grant pursuant to the Federal Land Policy and Management Act, for rail and road access to the site. Approximately 33 miles of the rail system which runs from Ferrum to the mine site is located on public land.

An exchange of land between the BLM and KSR would also be necessary to place the entire landfill site under private ownership and thereby, would allow KSR to lease the land to MRC for the landfill use. In the exchange, BLM would be acquiring lands which would benefit their biological, cultural, scenic, and other resource management programs. The exchange would involve approximately 2,800 acres of public land, much of which is under unpatented mining claims and mill site claims to KSR.

Potential issues include, but are not limited to, air quality, social and economic impacts, ground and surface water quality, desert tortoise, bighorn sheep, cultural or historical resources, and recreation and wilderness values.

FOR ADDITIONAL INFORMATION CONTACT: Marianne Wetzel, Palm Springs-South Coast Resource Area, 400 S. Farrell Drive, Suite B-205, Palm Springs, California 92262.

Dated: November 8, 1989.

Ron Yokota,

Acting District Manager, California Desert District.

[FR Doc. 89-26790 Filed 11-14-89; 8:45 am]

BILLING CODE 4310-40-M

[ID-943-90-4214-11; I-2037]

Proposed Continuation of Withdrawal; Idaho

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice.

SUMMARY: The U.S. Forest Service, Department of Agriculture, proposes that a withdrawal of 39.31 acres for the Cunningham Bar Recreation Area in the Salmon National Forest continue for an additional 20 years. The land is now being used as a recreation site. The land would remain closed to surface entry and mining. The land has been and will remain closed to mineral leasing by an overlapping withdrawal.

EFFECTIVE DATE: February 13, 1990.

FOR FURTHER INFORMATION CONTACT: Sally Carpenter, Idaho State Office, BLM, 3380 Americana Terrace, Bosie, Idaho 83706, 208-334-1720.

The U.S. Forest Service proposes that the existing land withdrawal made by Public Land Order No. 4624, be continued for a period of 20 years pursuant to Section 204 of the Federal Land Policy and Management Act of 1976, 90 Stat. 2751; 43 U.S.C. 1714. The land is described as follows:

Boise Meridian

T. 23 N., R. 14 E.

sec. 1, lots 3, 7, and that portion of lot 4 east of the centerline of Wheat Creek.

The area described contains 39.31 acres in Idaho County.

The withdrawal is essential for protection of substantial capital improvements on the Recreation Site. The withdrawal closed the described land to surface entry and mining but not to mineral leasing. However, the land has been and will remain closed to mineral leasing by an overlapping withdrawal. No change in the segregative effect or use of the land is proposed by this action.

For a period of 90 days from the date of publication of this notice, all persons who wish to submit comments in connection with the proposed withdrawal continuation may present their views in writing to the Idaho State Director at the above address.

The authorized officer of the Bureau of Land Management will undertake such investigations as necessary to determine the existing and potential demand for the land and its resources. A report will also be prepared for consideration by the Secretary of the Interior, the President, and Congress, who will determine whether or not the withdrawal will be continued; and if so, for how long. The final determination of the withdrawal will be published in the **Federal Register**. The existing withdrawal will continue until such final determination is made.

Dated: November 3, 1989.

William E. Ireland,

Chief, Realty Operations Section.

[FR Doc. 89-26789 Filed 11-14-89; 8:45 am]

BILLING CODE 4310-GG-M

National Park Service

National Capital Region; Public Workshop

Notice is here by given in accordance with the Federal Advisory Committee Act that a public workshop will be hosted by the National Park Service, Saturday, November 18, from 9:30 a.m. to 12 noon, at the Jefferson High School in Shennandoah Junction, West Virginia, located approximately 5 miles north of Charles Town off Route 9. The purpose of the meeting is to present alternatives on the special park boundary study as authorized by Congress. This workshop is a follow-up to the March 11, 1989 workshop held to gather ideas on the special park boundary study.

This study of lands adjacent to the park is to consist of three (3) parts: the first is to focus on protection alternatives for the largely undeveloped lands comprising School House Ridge just west of the National Park; the second is to focus on protection alternatives for largely undeveloped lands in the down river view of the Potomac from Jefferson Rock located in the Harpers Ferry National Historical Park; and the third is to focus on the remaining largely undeveloped lands containing outstanding cultural or scenic lands that are integral to the telling of the park's story or maintaining its setting.

The number of acres involved are approximately 1200 acres in Jefferson County, West Virginia; 100 acres in Washington County, Maryland and; 100 acres in Loudoun County, Virginia.

The study excludes developed lands in and around the towns of Harpers Ferry and Boliver, West Virginia and Sandy Hook, Maryland.

There will be a fourteen (14) day comment period following the workshop. Comments may be sent to the following address: Superintendent Donald Campbell, Harpers Ferry National Historical Park, Harpers Ferry, West Virginia 25425.

FOR FURTHER INFORMATION CONTACT: Resource Manager Bill Hebb at (304) 535-6371 Ext. 6224.

Dated: November 6, 1989.

Robert Stanton,

Regional Director, National Capital Region.

[FR Doc. 89-26803 Filed 11-14-89; 8:45 am]

BILLING CODE 4310-70-M

Subsistence Resource Commission Meeting

AGENCY: National Park Service, Interior.

ACTION: Subsistence Resource Commission meeting.

SUMMARY: The Superintendent of Wrangell-St. Elias National Park and Preserve and the Chairperson of the Wrangell-St. Elias National Park Subsistence Resource Commission announce a forthcoming meeting of the

Notices of Scoping Sessions

RECEIVED
NOV 20 1989
REC

EAGLE MOUNTAIN PROJECT UPDATE

A monthly status report prepared by Mine Reclamation Corporation **Issue No. 4, Oct.1989**

EIS SCOPING SESSIONS SCHEDULED

The Bureau of Land Management has issued the "notice of intent" for the preparation of an environmental impact statement (EIS) on the project and has scheduled three scoping sessions. The sessions will be similar to those held by Riverside County for the state-required environmental impact report (EIR) but will be conducted as formal public hearings. The primary purpose of each session will be to solicit comments on what should be addressed in the EIS.

The meetings will be run by the Bureau of Land Management, with Riverside County staff also participating.

WEDNESDAY, DECEMBER 6
7 PM
LAKE TAMARISK RECREATION CENTER
26-251 Parkview Drive
Desert Center

THURSDAY, DECEMBER 7
7 PM
PALM DESERT CITY COUNCIL CHAMBERS
73-510 Fred Waring Drive
Palm Desert

MONDAY, DECEMBER 11
9 AM
SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
818 West 7th Street, 12th Floor
Los Angeles

If any of the times or locations of the sessions should change, MRC will send notices to everyone on the newsletter mailing list. Times and locations also can be confirmed by calling Leslie Jensen of MRC at (213) 868-5005.

XU U 11/30 11/0

IMMEDIATELY, Nov. 29, 1989
Russ Kaldenberg, 619/323-4421
Barbara Maxfield, 714/276-6383

DRAFT

CDD-90-11

Eagle Mountain Landfill Proposal Subject of BLM Meetings

Public meetings to identify significant issues and concerns related to a proposed waste disposal facility at the Eagle Mountain Mine have been scheduled in December by the Bureau of Land Management's Palm Springs South Coast Resource Area. The information gathered at the meetings will be used in developing a joint County-Federal Environmental Impact Report/Statement for a proposed right-of-way and land exchange necessary for project implementation.

The Mine Reclamation Corporation has proposed using an inactive iron mine owned by Kaiser Steel Resources, Inc., located approximately 10 miles north of Desert Center and an associated railroad spur as a regional site for retrievable storage and disposal of nonhazardous municipal solid waste generated in Southern California.

The public scoping meetings have been scheduled as follows:

December 6 7 p.m.	**Lake Tamarisk Recreation Center** 26251 Parkview Drive in Desert Center
December 7 7 p.m.	**Palm Desert City Hall** 70510 Fred Waring Drive in Palm Desert 73510
December 11 9 a.m.	**Southern California Association of Governments** 818 West 7th Street, 12th Floor Conference Room in Los Angeles

Public comments also will be accepted until December 20, 1989, at BLM's Palm Springs-South Coast Resource Area, 400 South Farrell Drive, Suite B-205, Palm Springs, CA 92262.

Potential issues already identified include air quality, social and economic impacts, ground and surface water quality, desert tortoise, bighorn sheep, cultural or historical resources, and recreation and wilderness values. Other significant issues and concerns identified during the scoping sessions will be included in the environmental analysis.

The corporation has leased approximately 8,300 acres of the Eagle Mountain Mine and the 52-mile private railroad for a period of 100 years. If authorized, the landfill would open in 1991 and eventually process up to 20,000 tons per day. The estimated capacity of the proposed landfill is in excess of 500 million tons, with a minimum life of 100 years. The project would be developed to meet stringent state and federal regulations for municipal solid waste landfills. BLM would need to convert the existing legislatively approved railroad right-of-way for mining use to a BLM-approved right-of-way for railroad and road access to the site. The agency also would exchange approximately 2,800 acres of public land included in the site for private lands with sensitive biological, cultural, scenic, or other resource values.

-BLM-

Notes from 7 Scoping Meetings

DESERT CENTER AREA SCOPING SESSION
August 30, 1989
7:00 PM

Number of persons attending: approx. 50

- Why are the scoping sessions being held now, when mobile home residents are not in town?
- What will divert water from the pit, from the farms and other property east of the mine?
- Who decides who will do the EIR? Will it be a full EIR?
- Air pollution from diesel trucks and the dispersion of that pollution should be addressed.
- Will the public get to see the permit applications before they are approved?
- Is this the only chance the public will have to comment?
- There is an active seismic fault running through the east pit.
- Groundwater is the single most important concern.
- The biggest problem will be hazardous waste in the loads arriving at Eagle Mountain.
- What will be done to prevent pollution and health hazards at the landfill and at the transfer stations?
- Will leachate be formed, and, if so, what will be done with it once it is collected?
- Letters from MWD indicate that the east pit is over a massive water resource; a letter from Environmental Affairs Secretary Sharpless says all waste management projects must be included in the County Solid Waste Management Plan.
- There is a large amount of water in the east pit, and trees.
- How will the dump affect the desirability of living in Desert Center/Lake Tamarisk?
- A detailed assessment of the transfer stations should be included in the EIR for the landfill, especially since hazardous waste are a major concern.

- Water in the east pit was a major issue in the late 1970s, and there was a problem trying to pump it out then.
- What categories of waste can go into a Class III landfill?
- Where and how does County control come in?
- Approval of the project is a political issue, already decided.
- What impacts will the project have on the big horn sheep and other species?
- The EIR should address alternatives to landfills; the volume of waste going to landfills should be reduced at the transfer stations.
- What happens to the waste after it is landfilled? What compounds does it form, and which of those compounds are toxic?
- Will tires be accepted at the landfill?
- Safety issues need to be addressed at truck and rail crossings near the school.
- Will the rail/truck crossing be at grade or an overpass?
- What is the relationship between Kaiser and MRC? Will Kaiser be involved in the landfill operations? Which firm has ultimate responsibility for how the land is used?
- The EIR should address the larger context of the waste management crisis.
- The EIR should address alternatives to landfills.
- Recycling should be done at home.
- Will the project deter recycling efforts? Will it deter the development of other waste management options and technologies?
- Has MRC already selected transfer station sites?
- The use of trucks onsite and to haul containers of waste to Eagle Mountain should be addressed.
- The landfill and equipment should have use the best available technology.
- What will be the economic impacts of the project on the community? How much money will be coming into the community?
- What will be the air quality impacts of all equipment used at the site?

- Which agencies were notified about the preparation of the EIR?
- What will be the effects of the project on the aqueduct?
- Is MRC's President a former Kaiser employee?
- How much money will Kaiser get out the deal?
- What are the specific terms of the lease that MRC has with Kaiser?

INDIO SCOPING SESSION
August 31, 1989
7:00 PM

Number of persons attending: approx. 10

- Will there be a contingency plan for disasters at the site and on the rail line, such as fires, derailments, floods, etc.?
- What will be done with the waste if there is a temporary shut down of the rail line or access to the landfill?
- What will be the effect of the trucks and trains on air quality? What will be the impact of the trucks on roads?
- The EIR should address the local traffic impacts of each train to and from the landfill and the impacts on the rail system.
- How much existing train traffic is there on the SP mainline?
- What will be the economic impacts on the cost of disposal for households and businesses?
- What will be the traffic impacts of the truck traffic, who will pay for road improvements, and who will pay for road maintenance? What will be the impact of the trucks on Interstate 10?
- Could all the waste be transferred by rail (no trucks)?
- Where will the trucks come from and what limitation will be put on when the truck option can be used?
- Will the containers be cleaned/washed after they are emptied, and, if so, what will be done with the water used?
- The quality and capacity of the existing sewage treatment needs to be examined.
- The site should be required to treat and recycle water rather than discharge effluents to the sewer.
- The effects of flash floods on the landfill and train tracks should be examined.
- Are there endangered species on the site or along the rail line?
- What will MRC do about future liabilities?

- Does Kaiser actually own the land at the mine site? What about the rail access?

- Herzog was involved in waste-to-energy in San Diego, will the same be proposed for Eagle Mountain?

- Will mineral resources at the site be protected? Will mining occur in the future? What does the State have to say about this?

- Transfer stations should be covered in detail in the EIR, especially since they are where the controls on hazardous wastes must be exercised.

- The transfer stations should be required to meet the most stringent standards applicable in the region.

- What is being or should be done in the metropolitan areas to reduce the volume of waste produced?

- Quality control and inspections are essential at the landfill and transfer stations.

- The trains should be tagged so that they can be tracked.

- MRC should be required to pay for all site monitoring as a condition of any permit it receives.

- How can the permits be used to ensure the site is monitored?

- Waste management/landfills should be controlled as a public utility.

- Limits should be put on the fees charged at the landfill and the profit that MRC can make.

- Controls should be put on the total number of transfer stations that MRC can operate and the volume of waste they can contract for; MRC should not be allowed to contract for more waste than Eagle Mountain can handle daily.

- The EIR should give a detailed breakdown of the tipping fee, including MRC's profit margin.

RIVERSIDE CITY SCOPING SESSION
September 1, 1989
9:00 am

Number of persons attending: approx. 15

- Does MRC have transfer station sites?
- Trucks owned by Waste Management were out in the Desert Center area. Is MRC involved with Waste Management?
- What regulations apply to landfill liners? Will the Eagle Mountain site be lined? If so, with what?
- How far away is the school from the landfill site?
- Does Kaiser or MRC have plans to sell the aggregate on site?
- Does Kaiser or MRC have plans for the Black Eagle pit?
- If mining is resumed, will blasting be used and, if so, what effect will it have on the landfill?
- Does the rail line have access road south of Interstate 10?
- What will be done to protect groundwater in the event of spills (derailments or crashes that would cause the containers to spill their contents)?
- How will the waste stream be controlled?
- What kind of emergency equipment and contingency plan will be used in case of derailments or other disasters?
- What assurances will be given that no hazardous waste will come to Eagle Mountain?
- What permits will be required?
- What plans does MRC have to clean up the water after it is contaminated?
- Is it possible to make permit conditions permanent?
- Who is going regulate the volume of waste going to the transfer stations and then to Eagle Mountain? How will we know that the site isn't taking in more than it's permitted to?

- What health hazards to workers will the transfer stations pose? What kind of training will the sorters have?

- How sturdy are the containers for the waste loads and for the recyclables?

- Will the loads of recyclables have any hazardous components? When the loads are stored at Eagle Mountain, will they produce contaminants or safety problems?

- What other landfill sites have been studied?

- Is the project economically feasible?

- What about local agricultural concerns?

- The EIR should take into account water supply and quality reports prepared back in 1960.

- The project should be reviewed in the context of MWD's long-range plans.

- What will be done with the methane produced at the site? Will the trash be sprayed with water to generate methane? If so, will that water seep through the landfill eventually?

- What is the site leaks in the future? Will Kaiser and MRC be held liable?

- What will be the environmental impacts of excavating the ponds for liner materials? Will there be open pits when the material is removed?

- The moisture content of the waste should be checked.

- Will the EIR look at plastic liners as well as the proposed clay liner?

- How much methane will leave the site?

- What is the quality of access roads to the site and along the rail line?

- Who will pay for the improvement and maintenance of the roads?

- This type of project would make more sense if there were a regional waste management plan and a regional Joint Powers Agency for waste management. A model solid waste plan should be developed for the SCAG region.

- What heath and safety threats will the storage of recyclables pose? What about the landfill?

- Will the recyclables be cleaned before they are moved out of the transfer stations?

- How does MRC propose to do litter control in protected park areas? What can be done to prevent winds from spreading litter?

- Is the site affected by the proposed desert wilderness act?

BLYTHE SCOPING SESSION
September 14, 1989
7:00 PM

Number of persons attending: approx. 15

- Are there other sites of this scale?
- How many trucks per day and how much waste would be carried by each one?
- How far west will the landfill go?
- What kind of drainage and flood control systems will go in?
- What effect will rain have on rail and landfill operations?
- What kind of liner will be used? What's in the material proposed as a liner? What will be the effect of pressure from waste in the landfill on the liner? Is the liner impermeable?
- Photos of rain damage in the area from a recent storm are available.
- The material proposed for liner are already contaminated, and the ponds that hold it leaked.
- Are there fissures under the pit from all the blasting during mining operations?
- What else could be done with the site?
- What effect will the project, including its truck road, have on local businesses?
- What type of trucks and other equipment will be used?
- What is the estimated lifespan of the landfill? What provisions will be made to handle the site after it's closed?
- Are there plans for aluminum refabrication at the site?
- Will tailings be used for cover at the landfill?
- Does Kaiser or the County own the site?
- How much land is MRC leasing and how much is being used for the landfill?

- If there are not plans for landfills in the other two pits, why is MRC leasing so much land?
- What will be done on the rest of the property?
- MRC should adopt the guidelines/policies proposed by the Coalition for an Environmentally Responsible Economy, which call for risk assessments, damage control, full disclosure, and environmental audits.
- Who decides if another EIR is needed if other activities are proposed at the site in the future?
- What does Kaiser stand to gain from the project?
- How will the Cranston bill affect the project?
- What will be the impacts on the eastern portion of the County?
- Will the desert tortoise be affected?
- Herzog Contracting was involved in waste-to-energy in San Diego, will the same be proposed for Eagle Mountain?
- What will be done to stop illegal dumping of hazardous waste at the transfer stations and the landfill?
- Where will fuel be stored at the site and how much?
- Will tires be accepted at the landfill?
- What materials can be accepted at a Class III site?
- Who will be doing the screening at the transfer stations? Will they know what to look for?
- How many jobs will the project provide? What will be its economic impacts?
- Will the jobs at the site be union or non-union?
- What wastes will be prohibited from the site?
- What does the County mean when it says that 50% of the revenue will go to desert communities?
- Who will pay for the improvement of maintenance of the roads and rail line?
- What is LA doing to recycle more waste?

- Is there work already going on at the site (preparation for landfill operations)?

- Will BLM get any royalties from the landfill?

Memo to: Jean Carr
From: Bob Coale
Subject: Scoping Meeting Comments
Date: December 11, 1989

Below are listed the comments received during the final EIS scoping meeting held on December 11, 1989.

1. How will greenwaste be handled? Is composting to be employed? PD, A

2. Will the EIS propose or establish criteria regarding the degree of separation of recyclables that will be required before trash can be landfilled at Eagle Mountain? PD. A

3. What is the worst case scenario regarding the storage of recyclables in containers at Eagle Mountain? Is there to be a limit on the number of containers, the space to be occupied by containers or other criteria used to limit the storage of recyclables at EM? PD. A

4. In the event of an earthquake or other disaster that would disable the rail delivery of refuse to EM, what will be done to ensure the continuation of refuse delivery to EM. What internal flexibility/storage exists within the system to prevent bottlenecks from causing difficulties? PD. A

5. It is desired that monitoring wells be sampled from several horizons to ensure that various water strata are adequately represented. Specifically, it was suggested that monitoring be performed from a depth of at least 350' in Jim Capp's well. WQ

6. Allen Reames desires a copy of AB2448. PD. A

Memo to: Jean Carr
From: Bob Coale
Subject: EIS Public Scoping Meeting Comments
December 8,1989

I have listed the comments/questions that were made during the two EIS Scoping meetings held in Desert Center and Palm Desert on December 6 and 7, 1989.

DESERT CENTER COMMENTS

1. Will the red clay proposed to be used as a liner be analyzed to see if the clay itself may contain undesirable chemical or physical characteristics? WQ

2. How will the realigned rail line (and container truck road) cross Kaiser Road? T

3. Will an additional water treatment plant be built to handle leachate or other water.? WQ

4. What personnel training will be provided to new workers at the Project? S

5. What will be done to control residual liquids and hazardous wastes being placed in the landfill? S

6. What is the relationship between SCS/BLM/MRC/RECON? PD, A

7. What additional studies are being conducted on the desert tortoise and bighorn sheep? B

8.. What caused [County Supervisor] Corky Larson to change her mind about the Project? PD, A

9. What will be done to protect ground water quality? WQ

10. What are the economics of the project? How much income to County, MRC, desert communities, etc.? EC

11. How can MRC be 100% sure that the "contaminated clay liner" will not leak? What will MRC do when the liner does leak? WQ

12. How will the liner be placed on the pit sidewalls to ensure a water-tight seal? WQ

13. What can MRC do to eliminate the air pollution that is sure to result from the operation of 200 trucks per day to the site? AQ

14. Will the [waste hauling] trucks use the existing Kaiser Road? T

15. Are formaldehyde emissions from diesel truck exhaust more dangerous than other emissions from gasoline fueled vehicles? AQ

16. Richard Atwater [RWQCB director for the Lower Colorado Basin] has stated that the East Pit is full of cracks and cannot contain water. How will MRC contain wastes in the pit if this is true? WQ

17. Hydrogeologists have stated that water pollution as a result of the the landfill cannot be prevented. It is a matter of when, not if. How will MRC compensate the public for contaminated groundwater? WQ

18. What will be done to control sea gulls, rats, and other vermin? S

19. How was RECON selected? Is there any connection between Jean Carr [MRC] and John Larson [RECON] because of their past association on projects involving the K-rat? PD, A

20. What is the federal law for the selection of consultants by BLM? PD, A

21. Who [what agency] is responsible for inspecting MRC during the operation? PD, A

22. Who [what agency] will ensure that MRC has stopped pollution that it has caused? PD, A

23. How much time will be allowed for MRC to clean up pollution it has caused? PD, A

24. How will MRC reverse the damage that it has caused to the environment? PD, A

25. Who will pay for and execute cleanup of pollution? PD, A

26. How will MRC compensate local citizens for pollution caused by the Project? PD, A

27. How will intense local rainfall issues be handled? DR

28. How will water that falls into the pit be handled? DR

29. Will there be a ditch on the north and south walls to interrupt monsoon floods? DR

30. How will 200 trucks per day be handled on the steep grade to the [Chiriaco] summit? These will slow down traffic, damage the road, and annoy other Interstate users. T

31. Will MRC repair the existing Eagle Mountain rail line? PD, A

32. What will be done if the tracks wash out? What will happen to the trash? Will it be placed on a siding to rot? PD, A

33. Will the Eagle Mountain road be upgraded? T

34. How will the fumes from 200 trucks on the Eagle Mountain Road affect the residents of Lake Tamarisk which is directly downwind? Residents of LT have sinus and asthma problems. AQ

35. Will Southern Pacific deal with the added pollution that their engines will produce merely by paying fines, or will they take steps to reduce pollution? AQ

36. The project will be performed in a fragile desert environment. How can MRC justify this when they will degrade the area through noise, rodents, fumes, bugs, and traffic? N S AQ T

37. How does the proposed project relate to Stringfellow? If Stringfellow had leaks through a 5' liner, how is it possible that MRC won't have through only a 2' liner? PD, A

38. Will MRC line the pit with plastic? WQ

39. Why did the county do away with hazardous waste regulations that specify that these cannot be discarded within 30' of the water table, within 2000' of an agricultural well, and near schools and prisons? Eagle Mountain is the only place in the county where these conditions co-exist. Does this mean that there will be hazardous wastes placed in the pits? PD, A

40. Why use plastic liners? Even these will leak over 100 years. WQ

41. Will wells be sampled vertically? WQ

42. A CNN report indicated that this landfill is a "done deal". Is this true? PD, A

43. Is it possible for various involved agencies (BLM, Riverside County, RWQCB, etc.) to contact concerned citizens and ensure them that their (citizens) input is still useful? PD, A

44. Have other ways been considered to handle the trash beside Eagle Mountain? PD, A

45. Will the take into account the travel through and rail transfer in other communities? T

46. What is MRC's background? Who are its principals? Is MRC honest? How can we learn of MRC's credibility? PD, A

47. What laws exist to ensure that the agencies are not pulling a "quickie" on the public and that they will really react to cleanup requirements? PD, A

48. Is MRC totally responsible for the financial costs of cleanup [of environmental contamination]? PD, A

49. Is there anything that limits the amount of rubbish that can be placed in the pit on a daily as well as project lifetime basis? PD, A

50. How much will the tipping fees for the project be? What will happen to these fees? Will local trash collection costs increase? EC

51. Riverside County is already strapped with the problems of Stringfellow. Why not let another county take the problems associated with municipal solid waste? PD, A

52. If the "footprint" of the landfill is only about 1700 acres, what will happen with the remainder of the 5200 acres in the project? The remainder of the 8300 acres of the lease? PD, A

53. Is the only for the East Pit area? PD, A

54. Kaiser Road has not been upgraded or adequately maintained since Kaiser ceased operations. Will this road be upgraded? Who will pay for it? T

55. If the landfill is full and then contaminates the ground water, will all of the garbage be taken out of the pit? Where will it be put? WQ

56. What is the connection between the contamination resulting from an Otai dump [in San Diego] and Bill Herzog? WQ

56. How will vertical water wells [monitoring, extraction] be lined? WQ

PALM DESERT COMMENTS

1. Please define [in the documents] what portion of the 5200 acres will actually be used for the 1700 acre landfill. PD, A

2. Please include in the documents some conversions between acre-feet of trash, cubic yards of trash, tons of trash. PD, A

3. How will MRC respond to the effects of heavy rains that cause washouts of the rail line? D

4. If a disaster occurs [earthquake] that substantially increases the amount of trash generated, how will MRC respond? What is the elasticity of the system to accommodate short-term "overload"? PD, A

5. Will the trestle bridge on th EM rail line withstand earthquakes? G

6. Is RECON a truly independent entity in the EIR/S process? PD, A

7. What effects will the exhaust fumes from diesel engines and trucks have on the air quality in Joshua Tree National Monument? AQ

8. Why are trucks being allowed into the project at all? Why not use just trains? PD, A

9. Will alternate fuels for trains and trucks be considered? Will the rail lines be electrified?

~~PD, T~~
AQ

10. Will the EIR/S address whether the tailing contain hazardous components? WQ

11. If the tailing [for what ever reason] are not suitable for use in the land fill, will local soils be used? Where will these come from? Will cover have to be hauled in on the rail line? WQ

12. Will any refuse from Mexico be hauled to Eagle Mountain? PD, A

13. Will any recycling or other trash handling be performed in Mexico? PD, A

14. Will any trash be imported from Arizona? PD, A

15 Will the ground water quality of the Chuckwalla Basin be addressed in the EIR/S? WQ

16. Does the design of the EM rail line accommodate loaded uphill travel? The line was designed to handle downhill loads of iron ore. Is the structural integrity of the line such that it can handle this reverse traffic? PHA

17. Will county residents have to pay for maintenance to the EM rail line? To I-10? To the Eagle Mountain Road? To Kaiser Road? T

18 What is the impact of 200 trucks per day on I-10? T

Written Responses to NOP and NOI

Couldn't attend Plm Desert scoping meeting. Delivered hand C. Toenjes DLG 12/7/89

Bureau of Land Management
400 South Farrell Drive
Palm Springs, CA 92262

Re: TRASH BY RAIL
December 7, 1989

Sirs: Russell Kaltenberg

Enclosed is a copy of our letter to the Riverside County Planning Department in which we voiced our concerns over the proposed plan for "Trash by Train".

Added to these concerns would be the possibility that so called "low-level" radioactive materials may be included in the Eagle Mountain site if the NRC decides to go ahead with its proposal to deregulate radioactive materials.

We support recycling, ban on disposable diapers, plastic foam utensils and other non-biodegradable materials, storage on site above ground for easier monitoring, etc.

We feel that the Desert is under attack from every direction. This Trash by Train proposal is of such grave concern that it should possibly be put to a vote of the people rather than having the responsibility rest in the hands of a few.

Cut back on the garbage - recycle - ban materials not bio-degradable. Prohibit dumping on the Desert.

Thank you.

Carolyn Toenjes

Carolyn Toenjes 1863 Park Drive Palm Springs, CA 92262	Dollie Irwin 420 N. Morongo Banning, CA 92220	Pat Mahoney 4441 Mockingbird Lane Banning, CA 92220

September 25, 1989

MRC/EAGLE MOUNTAIN
TRASH-BY-RAIL
DRAFT/FINAL EIR
PUBLIC COMMENT

Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501
Roger Streeter, Planning Director
Ron Goldman, Chief Planner
David Mares, Planner

Dear Gentlemen:

In a recent conversation, by telephone, with Dave Mares, we were told to submit comments to your office regarding the proposed "Trash-By-Rail/Eagle Mountain project. We are sending you concerns and comments which we, as residents of the San Gorgonio Pass and Coachella Valley, would like addressed in the draft and final versions of the Environmental Impact Report, as mandated by the California Environmental Quality Act. We find it incredible that the County of Riverside is even considering such an idea (for this type of project) for 100 years. Shipping Los Angeles Orange, San Diego, other? county trash through and to Riverside County for $10 to $30 million dollars a year is not a reason to put Riverside County "up for sale". $440,000 to the Desert Center area does not mean that we are all for sale. That trash will go through our communities daily! We reject the approval of the memorandum of understanding with Mine Reclamation Corp. by the Riverside County Board of Supervisors that declares the County's intention to permit the disposal of L.A. County waste at Eagle Mountain. We question their right to enter into such an agreement.

We are fully aware that serious public controversy, under CEQA, could and should reject this project. We would like to now state, for the record, that we oppose any type of refuse, waste, trash or rubbish, both so-called household or toxic/hazardous and radioactive from anywhere outside of Riverside County, by any means of transportation, through and to Riverside County, for any means of disposal, burial or incineration anywhere in Riverside County.

As of September 1, 1989, the Bureau of Land Management had not accepted the role as co-lead agency in the project, Mr. Mares said. Has that agency (BLM) now accepted? What is the name of the person in charge at the BLM? If the BLM is not yet on board or chooses not to become involved in the project, could you please send us that information? Who, from the County is in charge as lead and/or co-lead? What company will do the EIR? Who is in charge? Who hired the company for the EIR and who will pay the bill? Also, what initiated this project? Was it a study by someone or some agency? Was it Kaiser Steel Resources, Southern California Association of Governments, The Santa Fe Railway Company, the Mine Reclamation Corporation? Others? We would like the names of the persons and companies, dates of proposals and the proposals showing Riverside County sites and routes, as well as any other information explaining how this proposed project originated.

How does it happen that the San Gabriel Valley cities feel so positive about this "Trash-by-Train"proposition that they are already organizing cities along the way to sign up for the long haul?

This portion of our comments, questions and concerns should be included with the following numbered items in the draft and final EIR as Resident/ Citizen public comment on the proposed project.

COMMENTS, QUESTIONS AND CONCERNS RE: TRASH BY TRAIN

1. State Department of Health Services officials recently reversed a decision requiring an EIR and approved plans to build a controversial toxic waste incinerator in Vernon, CA without an Environmental Impact Report. Who has final jurisdiction for the Mine Reclamation/Eagle Mountain trash by train proposal and could anyone for any reason dispense with the EIR?
2. Governor George Deukmejian and legislative leaders tentatively agreed on Sept. 5, 1989 to include incineration as part of a long term strategy to reduce solid waste in California by 50% before the year 2000. What guarantee will be provided that incineration will not become a part of "Trash by Train project now or in the future with Riverside County as the major holder of So. California trash if this project is approved?
3. Is there a plan for Los Angeles, Orange, SanDiego and other county trash, refuse etc. to be collected and separated at sites in Riverside County? or will trains be fully loaded upon entering Riverside Co.? We oppose Riv. Co. separation/loading sites.
4. Municipal refuse is known to contain toxic and hazardous materials, industrial, hospital and medical waste (some radioactive). By what method will this refuse be separated, identified and processed into non-toxic trash for transport to the Eagle Mountain site? Describe in detail, please.
5. Where will collection and separation sites be located?
6. What local, county, state, federal regulations will be used to insure (guarantee) that refuse is solid and non-toxic? Name the agencies that will monitor, inspect and have jurisdiction. How often will monitoring take place? What would the penalties be for violations? Please show plans for test wells and other monitoring devices at dump-site. We feel that once toxity shows up in test wells it is too late to stop further contamination.
7. Would Mine Reclamation use sub-contractors, under which jurisdiction, to collect, separate, monitor, load and transport refuse to Eagle Mt.?
8. To assure that this quick-fix, trash-by-rail scheme will not promote future trash accumulation (instead of curbing it) each city and county area producing refuse proposed for inclusion in this plan must submit recycling plans and ordinances based on current and projected population. Plans should reflect the entire time of contract for each city or county area. Projections should include breakdown in total tonnage of paper, plastic, glass, etc. Cities and counties not submitting recycling plans and trash projections should be refused access to the project.
9. All land-fills and dumps sooner or later produce toxic gases from decaying trash. How will toxic gas be eliminated from the Eagle Mt. site? How will flora and fauna and surrounding environment be affected? Describe in detail how gas will be eliminated from this site.
10. How would refuse be contained for shipment? Would containers be used only for trash transport or will other used be permitted on return trip?
11. Will chemical or other repellents be used? Will pesticides be required for insect and rodent control? for flies? Will pesticides be used on containers, rail cars, at collection, separation and loading sites and at dump-site at Eagle Mt. Please describe in detail.
12. Estimate in time loaded trains could be delayed on sidings or tracks in the San Gorgonio Pass and Coachella Valley areas. Explain and

describe occurances and describe in detail all impacts to immediate and surrounding areas.

13. Describe in detail the terms waste, trash, refuse, rubbish and list all ingredients per term.
14. In case of earthquake, train wreck/accident, fire, flood or other event causing rail transport stoppage enroute to dump, how will refuse be transported to Eagle Mountain site? Describe emergency plans for each event.
15. Cite least and worst case scenario for accident enroute to Eagle Mt. site. Give mitigation measures. Show response plan for all points enroute.
16. Cite least and worst case scenario for accident, ground water contamination, other air, land, water pollution and contamination to Eagle Mountain site and surrounding area. Give mitigation measures. Show response time.
17. Describe in detail responsibility and liability of Mine Reclamation Corp., BLM, Riverside County, Kaiser Steel Resourses, Southern California Association of Governments, Santa Fe Railway, San Gabriel Association of Cities, County, State, Federal Government agencies should the Public and/or the environment be damaged by any or all phases of this project. Show liability and responsibility for each year of total contract including dollar figures for each entity for each year.
18. In case of damage to public or environment, now or in the future, a pool of money must be on hand so that work for clean-up is not delayed while various parties and agencies quibble about who is going to pay. The tax-paying public should not be responsible for clean-up of the environment or damage to the public resulting from any phase of the trash-by-train project including contamination on or off site at Eagle Mountain and its impact on surrounding communities and desert environs. Show individual assets of all companies involved and how much will beset aside for this fund by each one.
19. Is a similar proposal for trash-by-train at the Morongo Indian Reservation at the eastern limit of the city of Banning a part of this project? If so, please describe and explain.
20. What tonnage per day will be transported and deposited at the beginning of project? What estimate of tonnage per day in 100 years at end of project?
21. The Riverside County backed Pass Area Community Plan, now in development, should be included in all trash-by-train studies and decisions.
22. Bullet train and Commuter service on existing rail lines is now being studied and proposed for So. California. Railroad rights of way are being considered for purchase for this purpose. Residents of the San Gorgonio Pass and the Coachella Valley strongly support commuter rail service linking the desert to communities on the coast and to the north and south. They much prefer riding those rails themselves rather than watching L.A. trash take the ride near their homes. Describe in detail how the Mine Reclamation/Eagle Mountain trash-by-train will impact future commuter-rail routes and services.
23. Will trash cars be added to trains already travelling or will they be on trains for the specific purpose of hauling trash?
24. Describe how this will impact future oommuter service and proposed bullet train service if trash"trains do their hauling at night, empty their loads, then return for more trash in an endless chain" as stated in a recent Los Angeles Times front page story. Show impact of constant shaking and effect on foundations of homes and commercial buildings and the Westinghouse nuclear facility. Describe impact to cities with housing in close

TRAIN-BY-RAIL con't.

proximity to those tracks. What effect will this have on property values? What will be done to lesson noise pollution?

25. This Draft and Final EIR should require input from all cities on route. All comments should be carefully considered before making a decision on this project.
26. Describe in detail how trash-by-train will impact missles-by-rail now being developed by the Department of Defense. Give estimates for impact and mitigation for 100 year period.
27. Describe in detail impacts to the California Desert Protection Act (as proposed) and other desert conservation and wilderness projects now in place or proposed for the future. We request that Jim Dobson, Director, California Desert Protection League, Los Angeles; Alan Cranston, U.S. Senator, CA.; The National Park Service; and Jeff Widen, California Desert Coordinator of the Sierra Club be contacted for input into the EIR.
28. Are existing rights of way to be used for trash-by-train, or will new routes and tracks be needed?

Thank you!

Sincerely,

Dollie M. Irwin

Dollie Irwin
420 N. Morongo
Banning, CA 92220

Carolyn Toenjes

Carolyn Toenjes
1863 Park Drive
Palm Springs, CA 92262

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

November 8, 1988

Mr. David Mares
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: California Public Utilities Commission's Review of the Eagle Mountain Project Notice of Preparation (NOP)

Dear Mr. Mares,

The California Public Utilities Commission's (CPUC) staff has reviewed the above-mentioned Notice of Preparation (NOP). The CPUC has jurisdiction over certain components of the proposed operation. These areas include: clearance above the centerline of the track (General Order 26-D) and construction and maintenance adjacent to trackage (General Order 118).

To ensure compliance with these and other Public Utilities regulations, the Commission's Railroad Operations & Safety Section will review all safety and operational components of the proposed operation. The Commission's review will include the examination of operating practices, track, rolling stock, and emergency plans that are prepared in compliance with both state and federal regulations. The contact person for this project is Mr. Jack S. Rich, Supervisor of the CPUC's Railroad Operations and Safety Section. Mr. Rich may be reached at (415) 557-1934.

We appreciate the opportunity to comment on the proposed project and look forward to receiving your subsequent publications.

Sincerely,

Elaine Russell, Supervisor
Environmental and Special Projects
Section

cc: Jack Rich, Railroad Operations and Safety

City of La Quinta

78-105 CALLE ESTADO — LA QUINTA, CALIFORNIA 92253 - (619) 564-2246
FAX (619) 564-5617

December 5, 1989

Ms. Marianne Wetzel
Bureau of Land Management
Palm Springs - South Coast Resource Area
400 South Farrell Drive, Suite B-205
Palm Springs, California 92262

SUBJECT: BLM CA-25594

Dear Ms. Wetzel:

With regard to the above-noted project, the City of La Quinta requests that consideration be given to providing access to the Eagle Mountain waste disposal facility for the communities located in the Coachella Valley, and in particular, the City of La Quinta. This can be accomplished by guaranteed allocation rights to the City for future use.

Please provide future correspondence regarding this facility to me.

Very truly yours,

Ron Kiedrowski

Ron Kiedrowski
City Manager

RK:JH/mr
cc: Planning & Development Department

MR/LTRJH.116

MAILING ADDRESS - P.O. BOX 1504 - LA QUINTA, CALIFORNIA 92253

Citizens Committee to Elect Patricia "Corky" Larson/Supervisor

October 12, 1982

Dear Agnes and Carter,

I hope the two of you are feeling fit as a fiddle now. Gosh, Carter, I knew Marines were tough but you sure bluffed out not feeling well when we saw you! Agnes, I hope you are over your fight with the bath tub! I was so sorry to hear of your fall.

I just can't thank you enough for all you have done for me. I like to think it is an investment in good government and I do pledge to work hard to represent Desert Center in a manner which will make you proud of your choice.

I was interested in Mr. Suitt's response to a question put to us in a radio forum the other day. The moderator said that dumps were becoming full and it was estimated that by the year 2025 (or some such date) they would be all full and we would have no place to dump. His question was, what would we as county Supervisor do about it. I about fell off my chair when Tom said to the effect, that one possibility would be to put our trash on the railroad cars since Southern Pacific Railway runs thru our valley and ship it to the Eagle Mountain mine to dump! I couldn't believe that. If I lived in Desert Center I would be furious at that, but the cost of that kind of proposal is ridiculous to even suggest as a solution.

What has changed Corky's opinion?

I don't know where Eagle Mountain people would be if they knew of his "solution" but if you are interested in the tape I'm sure that you could get a copy from Ed Kibbey, KPSI, 174 N. Palm Canyon, P.S. 92262.

I am convinced, Carter and Agnes, that the election will be won by a very small margin. He has already outspent me by over two to on and he is spending almost $12,000 on one local TV station while I am only spending $1,900. It will be the vote of the hinterland that will make the difference soanything that you can do will make an impact. Again, my thanks for all that you have done so far. God bless you both.

Fondly,

Corky

1520 Driftwood Drive • Palm Springs, CA 92262 • (714) 327-9689

EAGLE MOUNTAIN LANDFILL EIR/EIS

BUREAU OF LAND MANAGEMENT/COUNTY OF RIVERSIDE
SCOPING MEETINGS

RECEIVED
1989 DEC 18 PM 1:32
BUREAU OF LAND MANAGEMENT
P.S. AREA
CA.

WRITTEN COMMENT FORM

December 6, 1989
7:00 p.m.
Lake Tamarisk Recreation Center
26251 Parkview Drive
Desert Center, CA 92239
(619) 227-3203

If anyone wishes to respond in writing relative to determining the scope of the environmental document for the Eagle Mountain Landfill project, they are encouraged to do so.

Name: Marian Roberta Livengood

Address: P. O. Box 322
Desert Center, CA 92239

Phone Number: (619) 227-3182

Please note that all scoping comments must be received by the Bureau of Land Management by December 20, 1989. Address comments to:

Marianne Wetzel
Bureau of Land Management
Palm Springs-South Coast Resource Area
400 South Farrell Drive, Suite B-205
Palm Springs, CA 92262

Comments:

I was unable to attend the meeting, but I heartily agree with the statements made by residents of this community in opposition to the project.

There is no way you can assure the populace that no contaminants will seep into our drinking water. You assume that people will do their job and remove those items which are toxic; however, we all know that 'slip-ups' are made in any organization. Then, too late, it would be discovered, but we would have already been harmed. You cannot REMOVE toxins and carcinogens....

There was an excellent question stated in the Press-Enterprise article of December 7th. "...how are you going to compensate these people..." referring to loss of our water and therefore our homes. Is MRC providing a fund with which to buy our homes and farms when the water is ruined?

(Continued on next page)

Continuation of Written Comments...

The odors will probably be more than some of us can stand. We, who do not smoke, have very sensitive nostrils and the offensive odor may prove to be intolerable.

How do you propose to regulate or dispose of the methane gas that is a side effect of landfill operations?

What is your answer to the problem of ravens which will be attracted to the area by the garbage? They will feed on the young desert tortoise and other small animals. I share the concerns of the Park Rangers about the coyotes bringing diseases into our communit after feeding on the refuse.

Is the Los Angeles community ready to sacrifice their own drinkin water in order to dispose of their wastes in our mine pit? Let some of the garbage blow into the canal used by the Metropolitan Water District to transport their water and see if they enjoy drinking contaminated water. Do you think that the shortage of water in Southe California which is foreseen would ever place a need for our water which is contained in the large aquifer under this community? If it is contaminated, what good would it be?

Many of us in the community feel that Supervisor Patricia "Corky" Larson has "sold us out" quite sometime ago. Her actions toward this community have indicated that she wants us to fail. Although Riversid County as a whole will derive some monetary benefits from the landfill. is it worth sacrificing an entire community and Joshua Tree National Monument. What about the new "confinement facility" which is schedule to house 400 prisoners in the very near future? If we 'normal' citizens have no rights to stop this landfill, perhaps the prisoners should speak up. Perhaps they would have much more success in preventing it.

I am sure there is another area within this vast desert which might be used for the landfill. A pit could be dug as it was needed, and there are trains which run through other areas, as do roads, most of which are better than our little two-land road to Eagle Mountain.

I hope our concerns will be taken into consideration before any final commitment is made.

Sincerely,

Marian R. Livengood

Marian R. Livengood
P. O. Box 322
Desert Center, CA 92239

14 December 89

Dear Ms. Wetzel:

Please find enclosed my preliminary comments regarding the Eagle Mountain Mine Landfill proposed project.

I was unable to attend any of the three scoping meetings as a result of lack of timely notice. Somehow, my letter of 20 October wasn't answered until 04 December; with my receipt of it not until 11 December.

Please enter my name on the mailing list for this proposed project in order that I may receive and review EA's (draft and final) and the EIS (draft and final).

Thank you very much.

Sincerely,

Ron Ackert
P.O. Box 3251
North Shore, CA 92254-0986

P.S. Will you please send to me a copy of the Desert Plan and accompanying amendments. Mine was destroyed when my house burned to the ground this past September.

Thanks!

RECEIVED
DEC 18 PM 1:56
CA.

December 14, 1989

Ms. Marianne Wetzel
USDI-Bureau of Land Management
Palm Springs-South Coast Resource Area
400 S. Farrell Drive, Suite B-205
Palm Springs, California 92262

RE: 5440
CA-25594
(CA-066.32)

Dear Ms. Wetzel:

The proposed Eagle Mountain Mine landfill project is environmentally unsound and inconsistent with the Bureau's administration of Public Lands within the California Desert Conservation Area.

Issues of concern are as follows:

1. Contamination of the network of aquifers underlying the proposed project site resulting from the accumulation of toxic chemicals that will be transported to the site with "innocent" trash.

2. Decrease in the air quality throughout the regions the transportation corridors will pass through. This impact will result from increased rail traffic as well as the gaggle of heavy truck traffic generated by the proposed project. This impact will be felt from the points of origin as well as through and to the project site, thus negating or sharply reducing the ability to attain the pollutant standards recently proposed by the South Coast Air Quality Management District, as well as those standards set forth by and within the Federal Clean Air Act.

3. Negative impacts on the air quality of the Coachella Valley generally and the Salt Creek valley, Orocopia Mountain WSA's Chuckawalla Bench WSA specifically. This will result from the "trash trains" having to "pull grade" from the railroad siding (Durmid) adjacent to Salt Creek ACEC all the way to the project site.

4. Impacts upon Joshua Tree National Monument, Pinto Basin, Eagle Mountains WSA, Chuckawalla Bench and Orocopia Mountains WSA's resulting from "Trash Devil's" are estimated at being capable of scattering "innocent trash" over an area of (100) one hundred square miles in an area. Such and each subsequent event would spew trash over and into wilderness areas within Joshua Tree National Monument, Pinto Basin as well as BLM WSA's within the fall-out area.

RE: 5440
CA-25594
(CA-066.32)

At this point in time, the review process of this proposed project is in the very early stages, however, based upon what I have read about the proposed Eagle Mountain Landfill Project, the only conclusion I can offer at this time is as follows: Due to the unique and fragile ecosystem of the California Desert Conservation Area in general, and Joshua Tree National Monument, Pinto Basin, Chuckawalla Bench, the Bradshaw Trail (SR 301), WSA's within the Orocopia Mountains and the Salt Creek ACEC specifically, an ENVIRONMENTAL IMPACT STATEMENT on the proposed project is in order; pursuant to the provisions within the CDCA Final Plan and 40 CFR, et al.

Thank you very much for this opportunity to comment on the Eagle Mountain Mine Proposed landfill project.

Sincerely,

Ron Ackert
P. O. Box 3251
North Shore, CA 92254-0986

RECEIVED
DEC 2 2 1989
RECON

To B.L.M.

No to Los Angeles

Dec. 9, 1989

No to Los Angeles on bringing their trash either by trucks or trains to Eagle Mountain or any where else in Riverside County.

Teach these people to Recycle.

Look into City of Redlands & Ontario recyling programs.

American must Recycle.

Please don't let them into our County. They own most of land in Inyo County let them take it there.

Sincerely — Paul & Vernessa Slater
30925 Montgomery Ave
Nuevo Calif 92367

December 13, 1989

Bureau of Land Management
400 S. Farrell Drive, Suite B-205
Palm Springs, CA 92262

Gentlemen:

NI

We have been residents of Chuckwalla Valley for thirty years, having started a farm at that time. We have now owned a home and lived in Lake Tamarisk for the past fifteen years.

We are sorry we were unable to attend your meeting last week here at Lake Tamarisk. We do want to inform you, however, that we are definitely in favor of the proposed waste disposal dump at Eagle Mountain.

We do not feel that properly handled, as planned, it will do any harm to our area, and urge that you see fit to approve the plans.

Very truly yours,

Robert E. Anderson Ruth M. Anderson

Robert E. and Ruth M. Anderson
P. O. Box 495
Desert Center, Ca. 92239

Sierra C ub
San Gorgonio Chapter
Serving Riverside and San Bernardino Counties
Tahquitz Group • Los Serranos Group
San Bernardino Mtns. Group • Mojave Group
568 N. Mountain View Ave., Suite 130
San Bernardino, CA 92401
(714) 381-5015

September 1, 1989

David Mares
Riverside County Planning Department
4080 Lemon Street
Riverside, CA 92501

Re: Specific Plan No. 252, CZ 5499, CGPA 209
Eagle Mountain Project

Dear Mr. Mares:

The San Gorgonio Chapter of the Sierra Club appreciates this opportunity to respond to the NOP for the above referenced project. We believe the EIR should evaluate potential impacts to the following: groundwater quality, the Eagle Mtns Wilderness Study Area, bighorn sheep, desert tortoise and other biological resources, air quality, and public health and safety issues arising from the potential for exposure to hazardous materials and increased traffic hazards.

Additionally, the EIR should carefully describe the scope of the project and the regional context in which it occurs and address the following specific questions:

(1) What conservation programs will be implemented in conjunction with this waste disposal project? Will participating cities and counties be required to have waste reduction and recycling programs in place, and if so to what extent, as a condition of disposing of their remaining waste at this site? Will there be a regional comprehensive solid waste management plan prepared setting specific waste reduction and recycling requirements for local governments as a condition of participating in this regional solid waste disposal program? Will a JPA be established to develop agreements between various cities and counties as to the conditions under which solid waste may be disposed of at this landfill?

(2) How will rail transport of the solid waste from surrounding counties affect the potential for commuter rail services on the various rail lines connecting Orange, Los Angeles, San Bernardino, and Riverside counties?

The Sierra Club believes that society and the environment will both be best served by a solid waste management hierarchy emphasizing waste reduction, recycling and materials recovery to minimize landfill needs, resource consumption and environmental degradation. We would emphasize to the County, therefore, that should the Eagle Mtn. Landfill proposal pass environmental muster, it should be regarded as an important opportunity to advance the goals of waste reduction, recycling, and materials recovery by requiring maximum efficiency in these areas from all local entities which would desire to dispose of their residual waste at the landfill. While we do not know the current status of the bill, we would point out to the County that AB 997 (Bader), or a similar bill, could play an important role in this issue by requiring a regional comprehensive solid waste management plan for most, if not all of the area, served by this project. The development of such a plan in advance of or in concert with the approval of a landfill operation of this magnitude should be a very high priority.

Sincerely,

Bill Havert

Bill Havert
Conservation Coordinator

PD, T, A

SOLID WASTE MANAGEMENT DEPARTMENT

825 East Third Street • San Bernardino, CA 92415-0834 • (714) 387-2765

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
PUBLIC WORKS AGENCY

WILLIAM G. STERLING
Director

RECEIVED
SEP 07 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 1, 1989

David Mares
Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

RE: SPECIFIC PLAN NO. 252, ZONE CHANGE NO. S-499; COMPREHENSIVE GENERAL PLAN AMENDMENT NO. 209/EAGLE MOUNTAIN PROJECT

Dear Mr. Mares:

This letter is in response to your agency's Notice of Preparation for the referenced project. The Notice of Preparation does not indicate whether the inter-county solid waste issues listed below were included:

* Feasibility and potential impacts of accepting Municipal Solid Waste from County of San Bernardino.

* Importation of Municipal Solid Waste from other counties, through the County of San Bernardino.

* Traffic impacts to specific lines within San Bernardino County indentified as possible rail-haul routes.

* Possible waste control measures to limit disposal impacts from other counties and large commercial/industrial generators.

This department has no specific comments on the proposed scope of the Environmental Impact Report at this time. Please place this department on the mailing list for the Draft Environmental Impact Report. At that time, this department will provide comments on its analysis and recommendation.

I thank you for the opportunity to provide imput on the Environmental Impact Report. If you have any questions, please call me at (714) 387-2858.

Sincerely,

Martin Wilkins
Senior Associate Planner

cc: Michael Lerch, Land Management Department
Jeanie Blakesley, California Waste Management
Steve Ault, California Waste Management
Glenn Stober, Office of Planning and Research
State Clearing House

CITY OF LOMA LINDA CALIFORNIA
SERVING MAN
INCORPORATED 1970

City Of Loma Linda

25541 Barton Road, Loma Linda, California 92354 • (714) 799-2830 • FAX (714) 799-2891

From The Department Of Community Development

September 7, 1989

RECEIVED
SEP 11 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: NOP for Specific Plan 252

Thank you for the copy of the NOP referenced above.

The City of Loma Linda is concerned with the impact this project could have on the Southern Pacific Railroad lines through the City. Our main concerns would be:

1. The number of new trips per day generated by this project.

2. Time of day they would occur.

3. Length of trains.

4. Types of waste or recycled materials being transported through the City.

5. Type of railroad cars to be used.

6. A risk assessment for possible accidents involving the railroad and gas lines that are adjacent to the railroad tracks.

We would appreciate receiving the draft EIR when it is available.

Sincerely,

Mark R Pywell

Mark R. Pywell
Senior Planner

MRP:pr

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P O BOX 2711
LOS ANGELES CALIFORNIA 90053-2325

September 7, 1989

RECEIVED
SEP 14 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

REPLY TO
ATTENTION OF

Office of the Chief
Environmental Resources Branch

Mr. David Mares
Project Planner
Riverside County Planning Department
4080 Lemon Street
Riverside, California 92501

Dear Mr. Mares:

We have reviewed the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the Eagle Mountain Project, dated August 15, 1989.

Our responsibilities include investigation, design, operation and maintenance of water resource projects, including preparation of environmental guidelines in the fields of flood control, navigation and shore protection.

We are responsible also for administration of laws and regulations against pollution of the waters of the United States. We believe the forthcoming document should address the above-listed responsibilities.

Work in waters of the United States might require a permit under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. We cannot determine from the submitted information the extent of the Corps' jurisdiction over this project. Please give our Regulatory Branch documentation that clearly describes the area and extent of any proposed work in watercourses and adjacent wetlands to help us make that determination.

If the proposed project involves any Federal assistance through funding or permits, compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f) and implementing regulations, 36 CFR 800, will be required.

Please feel free to contact this office for any data that can help you prepare the projected document. The contact person for this project is Jim Myrtetus, telephone (213) 894-5423.

We will appreciate an opportunity to review and comment on the proposed DEIR when it is issued.

Sincerely,

Ruth Pérez Villalobos

for Robert S. Joe
Chief, Planning Division

PD, A. S,

CITY OF CULVER CITY
9770 CULVER BOULEVARD • P.O. BOX 507
CULVER CITY, CALIFORNIA 90230-0507

RECEIVED
SEP 21 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 7, 1989

Mr. Roger S. Streeter, Planning Director
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

ATTN: David Mares

SPECIFIC PLAN NO. 252, ZONE CHANGE NO. 5499, COMPREHENSIVE GENERAL PLAN AMENDMENT NO. 209; EAGLE MOUNTAIN PROJECT

Dear Mr. Streeter:

Thank you for the opportunity to comment on the Notice of Preparation for the above-referenced project.

It is requested that you list the criteria to be used for the selection of transfer stations throughout the Los Angeles County region. Additionally, those criteria should insure the possibility that such facilities are not located adjacent to or within close proximity to residential or environmentally sensitive areas.

It is also requested that you list the criteria to be used in selecting the railroad lines to be used in the transport of the waste material. Criteria should be developed that will allow the maximum safety concerns and protection to the surrounding area.

Please identify the environmental and economic benefits of utilizing railroad transit of waste material, as opposed to other methods of transit (i.e., truck).

If you have any questions, please contact Jackie Freedman, Project Planner, at 213/202-5777.

Sincerely,

Jay B. Cunningham

Jay B. Cunningham
City Planner

JBC:JF:ee

Copy: Mark Gauerke, Resource and Sanitation Manager
Jackie Freedman, Project Planner

CR

RIVERSIDE COUNTY PLANNING DEPARTMENT

CORRECTED
AGENCY NOTICE OF PREPARATION
OF
AN ENVIRONMENTAL IMPACT REPORT

RECEIVED IN ARU
AUG 18 1989

DATE: August 15, 1989

TO: UCR Archaeological Research Unit
900 University
Riverside, CA 92507

PROJECT CASE NO./TITLE:

Specific Plan No. 252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 209/Eagle Mountain Project.

PROJECT SPONSOR:

Mine Reclamation Corporation
550 N. Brand Blvd. 8th Floor
Glendale, CA. 91203

PROJECT DESCRIPTION:

A proposed regional Class III solid waste disposal site (sanitary landfill) combined with the storage, fabrication and sales of recyclable material; the repair and maintenance of railroad equipment, facilities, and rail cars used to transport waste to the site, landfill gas recovery and utilization, composting, leachate processing, renewal of mining operations, the continuance and/or expansion of existing residential and commercial land uses, and the continuance and/or expansion of the Return-to-Custody facility.

Collection of waste material is to occur primarily within the Los Angeles metropolitan area, at waste transfer station locations not yet determined; with other possible locations situated in the Southern California region. Transport of waste material is proposed to occur along various Southern Pacific rail routes throughout Southern California, and will be dependant on the location of the transfer station. It is anticipated that the disposal site, when operating at maximum operational capacity, will receive six (6) trains daily.

PROJECT LOCATION:

Portions of the Western and Central Chuckwalla Zoning Area located approximately 10 miles northwest of the community of Desert Center and approximately 1/4 mile south of Joshua Tree National Monument. The site covers, approximately 9,800 acres within the Eagle Mountains, and was previously known as the Kaiser Eagle Mountain Iron Mine.

4080 LEMON STREET, 9TH FLOOR
RIVERSIDE, CALIFORNIA 92501
(714) 787-6181

46-209 OASIS STREET, ROOM 304
INDIO, CALIFORNIA 92201
(619) 342-8277

The project proposes to establish several waste transfer stations within the Los Angeles metropolitan area, and possibly others in the Southern California region. Because specific locations have not yet been established, this project will not specifically address the waste transfer stations. Furthermore, any contemplated transfer stations will require review and approval by that individual city or county which has jurisdiction over that particular station's location. It is proposed that transport of the waste material will be via Southern Pacific rail routes throughout Southern California. At this time it is infeasible to determine which rail routes will be used, since the location of the transfer stations have not been finalized, and additional stations could be added later.

Pursuant to the Riverside County Rules to Implement the California Environmental Quality Act, notice is given to responsible and interested agencies, that the Riverside County Planning Department plans to oversee the preparation of an Environmental Impact Report for the project. The purpose of this notice is to solicit guidance from your agency as to the scope and content of the environmental information to be included in the EIR. Information in that regard should be submitted to this office as soon as possible, but not later that 30 days after receiving this notice.
9/14/89

Attached is a copy of the issues to be included in the draft EIR. If you have any questions, please contact David Mares, Project Planner, at (714) 787-2140.

Very truly yours,

RIVERSIDE COUNTY PLANNING DEPARTMENT
Roger S. Streeter, Planning Director

David Mares

David Mares, Planner III

A survey for cultural resources is recommended.

9/8/89

36

RECEIVED S, W, AQ

SEP 08 1989

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

RIVERSIDE COUNTY
PLANNING DEPARTMENT MRC

Mr. David Mares, Project Planner
Riverside County Planning Department
4080 Lemon Street 9th Floor
Riverside, California 92501

Dear Mr. Mares:

Notice of Preparation
of Environmental Impact Report
Eagle Mountain Solid Waste Disposal Facility

We have received your Notice of Preparation for the above-referenced project. The proposed project would entail development of a regional Class III solid waste disposal facility in the Eagle Mountains northwest of Desert Center. The project would require approval of a general plan amendment, zoning change, and specific plan. The comments herein represent Metropolitan's response as a potentially affected public agency.

Our review of the project site indicates that Metropolitan's Colorado River Aqueduct lies in close proximity to the proposed project location. The aqueduct is a major source of imported drinking water for Metropolitan's service area of 14.7 million people.

Since the aqueduct is an open water conveyance in the vicinity of the proposed project, water quality is a concern that should be addressed in the EIR. Specific concerns include the possible attraction of birds to the dump, and consequently to the nearby aqueduct, one of the few water sources in the area. Possible impacts on aqueduct water quality from wind-blown contaminants should be investigated. The effects on groundwater underlying the site should also be addressed.

We appreciate the opportunity to provide input to your environmental planning process. Questions regarding Metropolitan's facilities or rights-of-way should be directed to Mr. James Hale, Senior Engineering Technician at (213) 250-6564. Water quality questions should be addressed to Mr. Edward Means, Associate Director of Water Quality, at (213) 250-6412.

Very truly yours,

RLSoltz

Roberta L. Soltz, Ph.D.
Environmental Branch Head

JMG/ms

PD.A. G

STATE OF CALIFORNIA—THE RESOURCES AGENCY

GEORGE DEUKMEJIAN, *Governor*

DEPARTMENT OF CONSERVATION

DIVISION OF ADMINISTRATION
DIVISION OF MINES AND GEOLOGY
DIVISION OF OIL AND GAS
DIVISION OF RECYCLING

1416 Ninth Street
SACRAMENTO, CA 95814
TDD (916) 324-2555
ATSS 454-2555
(916) 445-8733

RECEIVED
SEP 18 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 12, 1989

Mr. David Mares
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Dear Mr. Mares:

Notice of Preparation (NOP) for the Eagle Mountain Project
SCH# 89081413

The Department of Conservation's Division of Mines and Geology (DMG) has reviewed the document submitted for Mine Reclamation Corporation's Eagle Mountain Project at the former Kaiser Steel Eagle Mountain Iron Mine site. We have the following comments on reclamation and mineral issues.

RECLAMATION -- The Surface Mining and Reclamation Act of 1975 (SMARA) and the State Mining and Geology Board regulations for surface mining and reclamation practice (California Code of Regulations (CCR) [formerly California Administrative Code (CAC)], Title 14, Chapter 8, Article 1, Sections 3500 et seq.) require that the reclamation plan for a mining operation identify proposed or potential future uses of the mine site upon the termination of the mining. The reclamation plan for the former Kaiser Steel mining operations should be reviewed to determine if the subject project is consistent or compatible with the goals of the plan. If not, the reclamation plan should be amended to allow the uses proposed in the Mine Reclamation Corporation's Eagle Mountain Project.

In reviewing the Mine Reclamation Program files, it is noted that this Department never received a copy of the approved reclamation plan for the Kaiser Steel mining operations, as required by CCR. As such, we cannot evaluate or comment on the issue discussed above.

Also, please send a copy of the approved reclamation plan for the Kaiser Steel Eagle Mountain Iron Mine to the Mine Reclamation Program Office at 650-B Bercut Drive, Sacramento, CA 95814, pursuant to Section 2778 of the Surface Mining and Reclamation Act.

MINERALS -- The planned use of the former Kaiser Steel Iron Mine, located on the site, represents a potential loss of a mineral resource. The current resource potential of the site should be assessed, as well as the economic value of this and adjacent deposits, as a source of raw materials for the cement industry both now and in the future. Regionwide sources of similar minerals should be identified, and their availability analyzed. Should the loss of the Eagle Mountain resources be found to be significant, mitigation measures should be developed.

If you have any questions, please feel free to contact me at (916) 322-5873.

Sincerely,

Dennis J. O'Bryant

Dennis J. O'Bryant
Environmental Program Coordinator

DJO:efh

cc: James Pompy, DMG
Zoe McCrea, DMG

AQ, W, B, AIR, N, PD

United States Department of the Interior

NATIONAL PARK SERVICE
JOSHUA TREE NATIONAL MONUMENT
74485 NATIONAL MONUMENT DRIVE
TWENTYNINE PALMS, CALIFORNIA 92277-3597

IN REPLY REFER TO:

RECEIVED
SEP 14 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 12, 1989

Riverside County
Planning Department
4080 Lemon Street, 9th Floor
Riverside, California 92501
David Mares, Project Planner

Dear Mr. Mares,

Joshua Tree National Monument has received a Notice of Preparation for an Environmental Impact Report from the Riverside County Planning Department for the Eagle Mountain Specific Plan, dated August 7, 1989, and a corrected Notice of Preparation dated August 15, 1989. Additionally, on September 1,1989 Bob Moon Chief of Resources Management for the Monument and I attended the scoping meeting in Riverside. We did provide oral input on several issues. However, to insure consideration of what we feel are extremely critical potential impacts to adjacent Park Service lands we have developed the following list of issues for consideration in the impact report.

The proposed landfill is less than one mile from the Monument's boundary and adjacent to the 92,000 acre Pinto Basin wilderness unit.This unit represents the most pristine example of Colorado Desert ecosystem under wilderness protection.

Issue 1. Air Quality
The Pinto Basin is a designated mandatory Class I air quality zone. Air quality related values include visibility of vistas to include definition of detail as well as color. In addition to concerns for compliance with Class I health related standards, visibility of dust or smoke from within the wilderness unit will have an adverse impact on the experience of wilderness users in this area.

Issue 2. Water Quality
Water quality issues are directly related to potential effects on springs in the Eagle Mountains utilized by wildlife such as bighorn sheep. In addition to water quality, potential impacts on availability of water in natural aquifers that are often isolated and unpredictable are also of concern.

Issue 3. Bighorn Sheep
During the years that the mine was in operation sheep in the Eagle Mountains adjusted to the activities of the mining. However, during the years that mining has been abandoned sheep may have returned to travel corridors between lambing areas, water sources and foraging areas. In addition to impacts on movement, changes in other local wildlife populations such as coyotes may further impact sheep behavior.

Issue 4. Raven Populations
The raven has been implicated in the loss of tortoises in the California desert. While raven predation may be natural under normal conditions, raven population explosions around landfills create a potential disaster for tortoises. A tortoise survey conducted in the Monument recently identified the Pinto Basin as one of the most significant population sites in the Monument for this Federally listed species.

Issue 5. Coyote and Kit Fox Behavior
Coyotes are one of the most adaptable desert omnivores subject to dramatic changes in behavior due to human influences. Coyote readily scavenge from human developments when the opportunity presents itself. Currently, Pinto Basin coyote populations are part of a relatively unaltered biological community. The presence of refuge and/or other animal life in the landfill could create significant impacts on coyote and kit fox as well as the natural system that has coevolved with them.

Issue 6. Light pollution.
The relative darkness of the eastern night sky in the Pinto Basin is a significant resource value to backcountry users. Night operations and the burning of waste methane could have significant impacts on the quality of visitor experiences.

Issue 7. Airborne Litter.
Litter is a blight on any landscape, however in a wilderness setting it is a violation of the congressional act creating and directing the management of these most reserved of all public lands. Late summer storm patterns which bring subtropical thunder storm activity out of the southeast will deposit debris, lifted by 40 to 60 mile an hour winds, directly into the Pinto Basin. Even during calm days temperature differentials create dust devils capable of lifting paper thousands of feet aloft is a matter minutes.

Issue 8. Noise and Smell.
Noise and smells from the landfill could represent another potential violation of the wilderness act that provides protection from "the hand of man." This problem would be most significant

during the winter months when cool damp air providers ideal transmission of both sound and smells. Unfortunately, this is exactly when visitors find the wilderness of the Pinto basin most attractive.

Issue 9. Monitoring and Mitigation

In addition to the potential impacts described above, there is the question of how impacts will be monitored and what steps will be taken to mitigate these impacts once detected. It's one thing to determine in a report that a given concern will not create unacceptable impacts, but follow-up monitoring to validate these conclusions must be a part of the program. Annual census studies of wildlife is one way to monitor effects and develop mitigation efforts. However, how will debris blown into the wilderness be monitored? As wilderness, no motorized transportation is permitted. Who will conduct foot patrols over this 92,000 acre unit to monitor compliance?

Rick Anderson

Rick Anderson
Superintendent

cc: J. Huddleston, WRO

PD.A.S

STATE OF CALIFORNIA—STATE LANDS COMMISSION

GEORGE DEUKMEJIAN, *Governor*

STATE LANDS COMMISSION
245 WEST BROADWAY, SUITE 425
LONG BEACH, CALIFORNIA 90802
TELEPHONE: (213) 590-5201

RECEIVED

SEP 18 1989

RIVERSIDE COUNTY
PLANNING DEPARTMENT

File Ref.: PRC 5678
SD 89-08-23

September 13, 1989

Mr. David Mares
Planning Department
Riverside County
4080 Lemon Street, 9th Fl.
Riverside, CA 92501

Subject: NOP Draft EIR for Specific Plan 252
Eagle Mountain Project
SCH 89081413

Dear Mr. Mares:

This is to advise that the State Lands Commission staff has determined that there are State interests in certain parcels within the area of the Eagle Mountain project of the Mine Reclamation Corporation. In particular, a State mineral extraction lease issued to Kaiser Steel Corporation for a portion of Section 36, T3S, R14E, SBM, is in existence and may be impacted by the proposed project. The other parcels of State interest will be identified in further correspondence with your office.

Please send any notices and copies of CEQA documents to the following office of the State Lands Commission as well as to the Sacramento Office:

State Lands Commission
245 West Broadway, #425
Long Beach, CA 90802
ATTN: Mr. D. J. Everitts

Yours truly,

ALEX E. GONZALEZ
Senior Mineral
Resources Engineer

AEG:vn:D63#18

20 Oct 89

IN RE: "THE TRASH TRAIN"

Dear Russ,

Don't take pic

2 The BLM State Office-Legal Section has advised me to write to you in regard to having my name placed on your office's mailing list for Bureau generated documents, studies, easement amendment applications, E.A.'s and or E.I.S. drafts etc., in regard to the trash train proposal at Eagle Mountain.

3 I would also like to receive a copy of the proposed wilderness designations that are due to be forwarded to Congress, but only those within the Indio and El Centro Resource Areas. As a true believer in the multiple use methodology put forth in the Desert Plan and also believe that the public lands administered by and through the BLM are best left that way and not placed in the hands of the lunatic fringe of the supporters of the idiotic Cranston Plan.

Thanking you in advance for your co-operation, I am,

Sincerely,

Ron Ackert

RON ACKERT
PO BOX 3251
NORTH SHORE, CA 92254-0956

75

STATE OF CALIFORNIA

GEORGE DEUKMEJIAN *Governor*

STATE LANDS COMMISSION

LEO T. McCARTHY, *Lieutenant Governor*
GRAY DAVIS, *Controller*
JESSE R. HUFF, *Director of Finance*

EXECUTIVE OFFICE
1807 - 13th Street
Sacramento, California 95814

CLAIRE T. DEDRICK
Executive Officer

RECEIVED
OCT 02 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

File Ref.: PRC 5618
SD 89-08-23

September 27, 1989

Mr. David Mares
County of Riverside
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Dear Mr. Mares:

Staff of the State Lands Commission (SLC) has reviewed the Notice of Preparation for a Draft Environmental Impact Report for the Mine Reclamation Corporation's Eagle Mountain Project and offer the following comments in addition to those we made dated September 13, 1989 (copy enclosed).

SLC Jurisdiction

The project appears to involve the following state-owned lands and interests in lands under the jurisdiction of the SLC.

SLC Parcel #	Description/Subdivisions	Interest	APN
233-011	T3S, R13E, S36, SBM; Lots 1, 2, 3, 4, 6, 7, 8	Full Fee	701-32-05, 06, 21, 22
233-577	T3S, R14E, S36, SBM; Lots 1-11, N2NW4, W2NE4	Reserved Minerals	701-38-06, 07, 15
236-540	T6S, R14E, S16, SBM; W2W2	Reserved Minerals	811-08-07
237-523	T7S, R12E, S36, SBM; SE4NW4	Reserved Minerals	719-13-02

These state-owned lands are part of the State's School Land Grant and are managed, by law, for the economic benefit of the State Teachers' Retirement System (STRS). A lease or permit will be necessary for their use in the proposed project.

As stated in our previous letter, a state mineral extraction lease to Kaiser Steel Corporation for a portion of Section 36, T3S, R14E, SBM already exists and may be impacted by the proposed project.

Content of the EIR

In general, it appears that the EIR proposed by the County will discuss all of the issue areas of concern to the SLC. However, the project description and purpose must be clear as to the transport, processing, storage and/or disposal of hazardous waste at the proposed site (III.B.22).

We appreciate the opportunity to comment and look forward to our review of the draft document. If you have any questions regarding SLC jurisdiction and permitting processes, please contact Alex Gonzalez in our Long Beach Office at (213) 590-5220 or Ed Chatfield in our Sacramento office at (916) 322-7821.

Sincerely,

Dwight E. Sanders

DWIGHT E. SANDERS, Chief
Division of Research
and Planning

DES:maa
Enclosure
cc: Claire T. Dedrick, Executive Officer
Lance Kiley, Chief, Division of Land Management and Conservation
Lisa Beutler, Manager, State Lands Section
Alex Gonzales

GJP

STATE OF CALIFORNIA—STATE LANDS COMMISSION GEORGE DEUKMEJIAN, Gover

STATE LANDS COMMISSION
245 WEST BROADWAY, SUITE 425
LONG BEACH, CALIFORNIA 90802
TELEPHONE: (213) 590-5201

File Ref.: PRC 5678
SD 89-08-23

September 13, 1989

Mr. David Mares
Planning Department
Riverside County
4080 Lemon Street, 9th Fl.
Riverside, CA 92501

Subject: NOP Draft EIR for Specific Plan 252
Eagle Mountain Project
SCH 89081413

Dear Mr. Mares:

This is to advise that the State Lands Commission staff has determined that there are State interests in certain parcels within the area of the Eagle Mountain project of the Mine Reclamation Corporation. In particular, a State mineral extraction lease issued to Kaiser Steel Corporation for a portion of Section 36, T3S, R14E, SBM, is in existence and may be impacted by the proposed project. The other parcels of State interest will be identified in further correspondence with your office.

Please send any notices and copies of CEQA documents to the following office of the State Lands Commission as well as to the Sacramento Office:

State Lands Commission
245 West Broadway, #425
Long Beach, CA 90802
ATTN: Mr. D. J. Everitts

Yours truly,

ALEX E. GONZALEZ
Senior ~~Mineral~~
Resources Engineer

AEG:vn:D63#18

NI

CITY OF RANCHO CUCAMONGA Post Office Box 807, Rancho Cucamonga, California 91729, (714) 989-1851

RECEIVED
SEP 15 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 13, 1989

Mr. David Mares, Planner III
Riverside County
Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

SUBJECT: EAGLE MOUNTAIN PROJECT

Dear Mr. Mares:

Regarding project case number and tiles: Specific Plan No. 252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 290/Eagle Mountain Project, the City of Rancho Cucamonga does not have any comments at this time. However, do to the potential sensitivity of such a project we (the City) would like to be kept informed of its status.

Thank you for the Notice of Preparation. Please keep us informed.

Sincerely,

COMMUNITY DEVELOPMENT DEPARTMENT
PLANNING DIVISION

Jeff M. Gravel
Jeff M. Gravel
Assistant Planner

JMG:sp

NI

CITY OF INDUSTRY

Incorporated June 18, 1957

September 13, 1989

Mr. David Mares
Project Planner
County of Riverside
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Re: **Specific Plan No. 252, EIR for the Eagle Mountain Class III Landfill**

Dear Mr. Mares:

The City of Industry has received your notice that an Environmental Impact Report (EIR) will be prepared for the above project. The purpose of this notice is to invite comments on the scope and content of the environmental information to be included in the EIR.

As indicated, the proposed solid waste landfill will be located near the Joshua Tree National Monument and is planned to be served by both rail cars and highway trucks alike. The City, being situated along two major rail lines, could potentially be a user of the facility and is thus interested in the success of the Eagle Mountain Project. Please keep us apprised of the project status.

In regards to the scope of the EIR, the City has no additional study requirements beyond those already stated in the project evaluation form.

Sincerely,

John J. Radecki, Jr.
City Engineer

JJR:JDB:slb

P.O. Box 3366, City of Industry, California 91744-3366
Administrative Offices: 15651 E. Stafford St.
(818) 333-2211

BERMUDA DUNES
RANCHO MIRAGE
INDIAN WELLS
PALM DESERT
LA QUINTA
INDIO

Desert Sands Unified School District

82-879 Highway 111 • Indio, California 92201-5678 • (619) 347-8631 • FAX# 342-1265

September 14, 1989

RECEIVED
SEP 15 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

Roger S. Streeter Planning Director
Attn: David Mares
County of Riverside Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: Specific Plan No. 252, Zone Change No. 5499, GPA No. 209, Eagle Mountain Project

Dear Mr. Mares:

The Desert Sands Unified School District is severely over crowded and we are now unable to construct three school projects totalling 64 classrooms which will not be funded due to lack of state funding.

The subject project poses a significant impact on our district because the project is regional in nature. The commercial aspect of the project will not pay school fees although the commercial use will cover over 9,800 acres of use. The use will generate numerous jobs and indirect employment impacting the district without adequate funding for new schools. Our enrollment is 29% over capacity now and it will increase without new schools and continued development.

The Desert Sands Unified School District is extremely concerned with this project unless appropriate mitigation can be maintained. We would urge that the project provide financial mitigation for growth inducing impacts.

We are sending you a copy of our <u>Capital Facilities Plan and Fee Justification Document</u> which indicates that we have significant problems with providing adequate school facilities.

If you have any question, please don't hesitate to contact my office. Please notify us of the hearing date on the matter.

Sincerely,

Richard M. Beck

Richard M. Beck, Director
Facilities Planning and Development

RMB:sdb

THE CITY OF POMONA

Development Department

RONALD H. SMOTHERS
Director

RECEIVED
SEP 22 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 17, 1989

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, Calif., 92501

RE: Notice of Preparation of the Environmental Impact Report- Specific Plan No. 252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 209/Eagle Mountain Projects

Thank you for the opportunity to provide input into the above Notice of Preparation. The City of Pomona is keenly interested in participating in the environmental review process.

The following specific issues would be of concern to the City and should be addressed in the Draft Environmental Impact Report:

1. Traffic impacts - Long trains and frequent occurrence could impact grade crossings. What delays can we expect at crossings, at what speed will they travel, and at what times of the day? Can we expect funds to help mitigate impacts, i.e., assistance with overcrossings/undercrossings?

2. Odors/Leakage - Containers/cars should be odor/leakage-tight to prevent objectionable odors and fouling of easements.

3. Landfill Capacity - Will the City of Pomona be using this facility as local landfills close?

4. Are there any off-site storage sites proposed in or near the City of Pomona?

We look forward to reviewing the DEIR when it is available. If you have any questions regarding these comments, please contact Steve Tarvin at (714) 620 - 2191.

Sincerely,

Steve Tarvin

Wm. Steven Tarvin
Assistant Planner

WST/dsk

City of Redlands

RECEIVED

SEP 21 1989

RIVERSIDE COUNTY
PLANNING DEPARTMENT

CITY OF REDLANDS CALIFORNIA

September 18, 1989

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

RE: Response to Notice of Preparation for Specific Plan 252, Zone Change 5499, General Plan Amendment 209/Eagle Mountain Project

Dear Mr. Mares:

The City of Redlands is concerned about the transportation of hazardous waste materials through the City. Specifically, the potential for spills or accidents along the I-10 and the rail corridor through San Timoteo Canyon. This concern is especially critical because of the existing and/or planned residential development in these areas.

Also, how will various materials be contained to keep them from mixing during transportation?

The City would like to see the issue of hazardous waste transport, accident potential and emergency response planning thoroughly addressed in the Environmental Impact Report.

Thank you for the opportunity to respond to the Notice of Preparation. We look forward to receiving the Draft Environmental Impact Report.

Sincerely,

Jeffrey L. Shaw
Community Development Director

JLS/PAM/cvd

30 CAJON STREET, P.O. BOX 2090 • REDLANDS, CA 92373

CALIFORNIA WASTE MANAGEMENT BOARD
1020 NINTH STREET, SUITE 300
SACRAMENTO, CA 95814

RECEIVED
SEP 14 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

SEP 11 1989

Mr. David Mares
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: NOP for County of Riverside Eagle Mountain Project, SCH# 89081413

Dear Mr. Mares:

Staff of the California Waste Management Board (Board) has reviewed the NOP for the project cited above, and offer the following comments.

Scope and Content of the EIR

1. **General**

For guidance on the scope and content of the EIR, staff has attached a "Disposal Site EIR Checklist" of information which we recommend be included in the EIR.

2. **Preliminary Identification of Environmental Issues**

The NOP lists 12 preliminarily-identified categories of environmental issues to be discussed in the EIR. Board staff recommends the following specific issues be discussed in the EIR:

a. **Public Health and Safety**, including a discussion of OSHA requirements and the potential health and safety impacts on landfill workers and employees during the construction, operation, closure, and postclosure maintenance phases of the landfill's life cycle. Workers at particular risk of injury or health are the railcar off-loaders, heavy equipment operators, the "spotters" of hazardous wastes, and "traffic directors" around the active face.

Staff recommends the EIR discuss the potential health and safety risks to, and mitigation measures for, clients of the landfill (e.g., refuse truck drivers) and other visitors to the landfill .

b. Hazardous Wastes, including a discussion of the frequency and procedures for load-checking and identifying, isolating, handling, storing, and removing any hazardous wastes found at the active face or elsewhere on site.

c. Maximum Permitted Daily Capacity, including a clear statement of the daily maximum number of tons of wastes which will be accepted during the life of this project, procedures for the early daily closure of the landfill when the maximum permitted daily capacity has been reached, and the proposed alternate sites for disposal of remaining refuse once daily capacity has been reached.

d. Liquid Wastes, including a detailed discussion of the types, volumes, and toxicity or hazardousness of any liquid wastes to be accepted for pond disposal on site. Additionally, how will the existing sewerage system for the community of Desert Center and the project employees be redesigned for capacity to handle all the expected sewage to be generated?

e. Vector Control, including a discussion of the types of disease vectors (rodents, flies, mosquitoes, gulls) prevalent in the site area and expected at the landfill, and specific mitigation measures for control of **each** of the four groups of vectors listed here.

f. Height Limits, including a clear delineation of the absolute maximum heights allowed for **each** Waste Management Unit.

g. Recycling, Reuse, Salvage, and Resource Recovery, including a full discussion of all such activities at the site, their potential environmental impacts and mitigation measures, planned at the site in the short-, medium-, and long-term periods (5, 10, and 20 years).

h. Encroachment, including a discussion of the expected types of encroachment of non-compatible land uses (e.g., recreational, residential, or commercial zoning) near the landfill over the next 20 years, potential environmental impacts on both the landfill operations and the encroaching developments, and measures to be used to prevent or minimize potential encroachment around the landfill.

i. Cost-effectiveness of Project and Alternatives, including a discussion and **data** demonstrating the cost-effectiveness of the proposed project and **all** reasonable alternatives to the project, such as recycling, waste reduction, incineration, expansion of existing landfills, transfer stations, waste-by-rail, waste processing, composting, and resource recovery.

j. **Aesthetics**, including a discussion of the impact of light from night-time operations, and the impacts on tourism at Joshua Tree National Monument.

k. **Closure and Postclosure Maintenance**, including a discussion of the closure and post-closure maintenance requirements of AB 2448 (Eastin, 1988), this Board's new emergency regulations, and the financial mechanisms to fund the closure and post-closure requirements

l. **Transportation/Circulation**, including a discussion of the expected impacts of the maximum number of daily train trips on each of the train/grade crossings the waste trains will traverse, in relation to the residential, commercial, industrial and emergency response traffic patterns in the communities surrounding each crossing.

What is the estimated loss of business and public revenues and human life and property expected from the implementation of this transportation system? For example, based on current State and national train-vehicle accident rates, how many deaths may we expect from the implementation of this project? Based on current State and national statistics, how many deaths or other irreversable losses of human health and losses of property may be expected, statistically, from emergency vehicle (ambulance, fire, police, hazardous materials response) delays in the crossing of grades when occupied by these trains?

Monitoring Programs for CEQA Mitigation Measures. The failure to carry out mitigation measures for projects approved under CEQA is causing increasing concern. AB 3180 (Cortese, 1988) addresses this concern by requiring that a lead agency adopt a reporting or monitoring program for each mitigation measure required in the certified environmental document. Compliance with this law should be addressed in the EIR.

Board Regulatory Authority and Local Requirements

The project proponent will, among other requirements, need to:

a. Demonstrate compliance with the California Environmental Quality Act (CEQA);

b. Demonstrate the project is consistent with and designated in the applicable City or County General Plan, and obtain a finding from the applicable land-use planning agency that adjacent land uses are compatible with the proposed use of the site (Title 7.3, Government Code (GC), Section 66796.41);

c. Obtain a Finding from the County Board of Supervisors that the distance form the landfill to the nearest residential structures is sufficient to ensure compliance with the Board's State Minimum Standards, prior to the landfill's establishment (7.3 GC 66784.2).

d. File a Notice of Proposed Facility with the Riverside County Waste Management Department and this Board (Title 14, California Code of Regulations (CCR), Sections 17927-17929 and 17936);

e. Obtain a finding of conformance with the County Solid Waste Management Plan from the Riverside County Waste Management Department (14 CCR 17937);

f. Obtain Waste Discharge Requirements and any other permits as required under Federal, State or local laws and regulations.

Note, the project proponent may not **construct** or **operate** the project until (i) all requirements are met and (ii) until the LEA issues the Solid Waste Facilities Permit.

Thank you for the opportunity to review this material. If you have any questions concerning these comments, please contact Steven Ault of the Board's Local Planning Division, at (916) 327-0453.

Sincerely,

for John D Smith
George H. Larson, Manager
Resource Conservation and Local Planning Divisions

cc: Robert Nelson, Riverside County Waste Management Department
John Fanning, Riverside County LEA
State Clearinghouse

Attachment: one

DISPOSAL SITE EIR CHECKLIST

I. GENERAL BACKGROUND INFORMATION

A. Project Location

B. Need for the Project

C. Area Served

D. Population Served

E. Population Projections

F. Existing Facilities

G. Conformance to County Solid Waste Management Plan

H. Regional Map

I. Designation in General Plan

II. PROJECT DESCRIPTION

A. Site Description

1. Topographic map showing site location
2. Size of the site (acres)
3. Site layout map (showing areas to be filled, sequence of filling, and property boundaries)
4. Total capacity of the site
5. Average quantity of waste to be received daily
6. Expected site life (years)
7. Current land use
8. Current zoning
9. All land use within 1000 feet of site boundaries -See Gov't Code Section 66784.2
10. Owner/operator of the Landfill
11. Classification of site (Class I, II, III etc.)

12. Classification of wastes to be received (Group 2, 3, etc.)

13. Ultimate end use of site

14. Maximum height of fill

15. Public and/or private use

16. Permits required by local and state agencies to implement the project - in sequence

B. Operations Description

1. Compliance with CWMB standards for handling and disposal (Title 14 CCR)

2. Method of disposal (area/trench/canyon)

   a) Construction of cells - height of cells, compaction

3. Depth of excavation

4. Maximum height of completed fill

5. Cover types - daily, intermediate

   a) Frequency of cover

   b) Thickness of cover

   c) Suitability of cover material

   d) Volume of cover material needed for the entire project

   e) Source and supply of cover - to end of site life

6. Anticipated waste compaction (lbs./cu. yd.)

7. Number & Job Titles of employees

8. Equipment - e.g. compactor, water truck, scraper, track dozer

9. Hours/days of operation - days/weeks of operation per year

10. Fire control provisions - on-site; nearest fire dept.

11. Vector control provisions - flies, rodents, birds, mosquitoes

12. Litter control provisions - fences, litter pick-up schedule

13. Traffic

    a) Access routes

    b) Present loading - project induced load

    c) On-site roads

14. Scales - number, weight limits, computerized recording

15. Odor control provisions

16. Dust control provisions

17. Record keeping

18. Erosion controls for wind, vehicular, run-on, run-off - e.g. berms, conduits, levees

19. Sedimentation controls - e.g. silt collection ponds

20. Landfill gas monitoring and quality assurance/quality control systems

21. Groundwater/Vadose zone monitoring sytems

22. Leachate controls

    a) Liner (if applicable)

        1. Permeability of liner (cm/sec)

        2. Sensitivity of line to acidic or caustic compounds

        3. Quality Assurance/Quality Control - installation

    b) Compaction of underlying soils

        1. Permeability achieved after compaction (cm/sec)

    c) Collection system

        1. Maximum gpm or gpd the system can handle: pumping, storage, disposal

    d) Recirculation

    e) Impermeable barriers

1. Permeability of barrier (cm/sec)

23. Leachate monitoring system

24. Description of storage or disposal areas for bulky items

25. Provisions for special wastes handled (e.g., liquids, sludge, etc.)

26. Resource recovery provisions - salvaging

27. Fencing and provisions for site security

28. Police protection

29. Drainage facilities and surface water routing

30. Flood protection facilities

31. Site improvements

    a) Water

    b) Bathroom and Shower

    c) Telephone

    d) Electricity and Gas

    e) Sewage disposal system - septic, sewer

C. Closure Procedures

1. Final cover

    a) Thickness

    b) Permeability (cm/sec)

    c) Grading

2. Revegetation

3. Responsibility for maintenance

4. Responsibility for monitoring

5. Length of maintenance

6. Closure/Post-closure maintenance fund

III. EXISTING ENVIRONMENT

A. Climate

1. Average precipitation

a) Seasonal

b) Annual

2. Seasonal temperaute range

3. Wind

a) Direction - seasonal

b) Velocity - seasonal

4. Evaporation rate

a) Seasonal

b) Annual

B. Air

1. Baseline air quality data

2. Existing vehicular emissions

a) Landfill equipment

b) Refuse vehicles

3. Projected vehicular emissions

a) Landfill equipment

b) Refuse vehicles

4. Evaporative emissions (from wastes disposed at site)

C. Surface Water

1. Existing surface waters (streams, rivers, etc.)

2. Drainage courses

3. Average seasonal flows

4. Greatest anticipated 24 hour or 6 day rainfall amount

5. Beneficial uses of waters - portable, agricultural, recreational

6. Water quality analysis - physical, organic, inorganic analyses

7. Watershed characteristics - sources, outflows

D. Subsurface Water

1. Existing subsurface water (aquifer, aquiclude, etc.)

2. Water quality analysis (from site specific tests)

3. Beneficial uses of waters

4. Location of private & public wells within 1 mile of site

5. Minimum depth of groundwater (from site specific tests) - seasonal

E. Geology

1. Description of subsurface strata (in place)

   a) Unified Soil Classification (CH, OH, etc.)

   b) Percent passing #200 sieve

   c) Liquid limit

   d) Plasticity index

   e) Underlying geologic formation - e.g. igneous, metamorphic, sedimentary

2. Permeability of soil (from field samples and not textbook figures)

3. Seismicity

   a) Faults underlying the site

   b) Estimate of seismic risk at the site (distance to nearest fault, maximum projected earthquake of the fault, etc.)

   c) Distance to nearest fault system

4. Boring logs (including boring locations)

5. Mineral deposits

F. Land

1. Descriptions of the site surface

2. Visibility from surrounding area

3. Maximum slopes on the site

4. Slope stability (recommended allowable cut)

G. Flora

1. Description of site flora

2. Vegetation which will require permanent removal

3. Relation between vegetation and slope stability and erodability

4. Rare and endangered flora

H. Fauna

1. Description of site fauna

2. Resident population of rodents and other vectors

3. Rare and endangered fauna

I. Noise

1. Background noise levels at and adjacent to the site

2. Location of noise receptors

3. Noise levels generated by landfill operation - peak and 8-hour maximum dB exposures in relation to OSHA regulations

J. Social

1. Growth inducement

2. Land use compatibility

    a) Zoning

    b) General plan compatibility

    c) Regional plan compatibility

    d) Adjacent land use

3. Aesthetics

a) Viewshed impact

K. Historic

1. Archaeological sites

2. Historical sites

IV. IMPACTS, MITIGATIONS, AND IRREVERSIBLE IMPACTS

A. Climate

B. Air

C. Surface Water

D. Subsurface Water

E. Geology

F. Land

G. Flora

H. Fauna

I. Noise

J. Social

K. Historic

L. Human Health & Safety

V. ALTERNATIVES

A. Alternative locations reviewed (not an in depth analysis but a general description)

B. Transfer station for waste transport to another landfill

C. Resource recovery and/or processing, and disposal of residual wastes

D. Other alternatives

E. No project

F. Larger & smaller project

VI. SUMMARY

A. Brief summary of project and existing environment

B. Identification (by use of matrix, outline, table, etc.) of all projects impacts and their respective mitigation measures

VII. ORGANIZATION AND PEOPLE CONSULTED

A. Public meetings

B. Public response to the local project

C. Persons contributing to the report and their qualifications

D. Persons consulted

CITY OF RANCHO MIRAGE

RECEIVED
SEP 21 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 19, 1989

Mr. David Mares, Project Planner
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, California 92501

Dear David:

This letter is sent in response to your notice of scheduled meetings regarding the preparation of an environmental impact report on the proposed Eagle Mountain specific plan.

We ask that the County Planning Department consider adding an economic element to the environmental impact report. We believe that this element should include an analysis of the cost and benefits associated with this proposal. Specifically, we are interested in an elaboration of economic benefits to be derived from the operation of the Eagle Mountain land fill.

Also, we believe it's appropriate that the County include the option of retaining 50% of the financial benefits derived from the land fill operations for the construction of needed public improvements in Riverside County, east of the Banning pass.

Thank you very much for your consideration of this request.

Best regards,

Stephen Birbeck
Assistant City Manager for Economic Development

SB:bam
M8909193

STATE OF CALIFORNIA—THE RESOURCES AGENCY GEORGE DEUKMEJIAN, *Governor*

DEPARTMENT OF FISH AND GAME

330 Golden Shore, Suite 50
Long Beach, California 90802
(213) 590-5113

September 20, 1989

Mr. David Mares
County of Riverside
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Dear Mr. Mares:

We have reviewed the Notice of Preparation of an Environmental Impact Report (EIR) for the Specific Plan No. 252; Zone Change No. 5499; CGPA No. 209/Eagle Mountain Project for the development of a proposed regional Class III solid waste disposal site (sanitary land fill) within a 9,800 acre area within the Eagle Mountains, previously known as the Kaiser Eagle Mountain Iron Mine. Collection of waste material is to occur primarily within the Los Angeles metropolitan area at waste transfer stations not yet determined. Transport of waste material is proposed to occur along various Southern Pacific rail routes throughout Southern California. To enable our staff to adequately review and comment on this project the following information should be included in the Draft EIR:

1. A complete assessment of flora and fauna within the project area. Particular emphasis should be placed upon identifying endangered, threatened, and locally unique species. Of special importance is the threatened desert tortoise and the project area should be surveyed for the presence of these animals.

2. Documentation of direct, indirect, and cumulative impacts expected to adversely affect biological resources within and adjacent to the project site.

3. Discussion of mitigation measures proposed to offset impacts. If project impacts result in the loss of desert tortoise habitat such losses should be compensated at a rate not less than that derived by the compensation formula approved by the Department of Fish and Game and the Bureau of Land Management. Management of the landfill should include measures that would discourage foraging by ravens. Waste materials should be buried as soon as feasible to avoid attracting ravens to the site and waste containers at the site should be covered. The desert tortoise population is declining throughout its range due to several limiting factors and raven predation upon juvenile tortoise is one of the factors. Desert users should take all measures necessary to avoid increasing the raven population within the range of desert tortoise.

4. An assessment of the potential impacts that the approximately 200 truck trips per day to and from the landfill site may have on the desert tortoise population. We recommend that tortoise-proof fencing be provided on each side of the highway if the assessment indicates that tortoise mortality would occur.

The project as described does not detail the work proposed for streambed alteration activity. The project sponsor must identify specific streambed alterations and flood control structures proposed in order for the Department to properly comment on this document. The applicant should be aware that if mitigation measures are not provided in this document, the Department may require such mitigation measures through jurisdiction established under Fish and Game Code Sections 1601-1603.

Diversion, obstruction of the natural flow or changes in the bed, channel, or bank of any river, stream, or lake will require notification to the Department of Fish and Game as called for in the Fish and Game Code. This notification (with fee) and the subsequent agreement must be completed prior to initiating any such changes. Notification should be made after the project is approved by the lead agency.

Thank you for the opportunity to review and comment on this project. If you have any questions, please contact Jack L. Spruill of our Environmental Services staff at (213) 590-5137.

Sincerely,

Chuck Thaver for

Fred Worthley
Regional Manager
Region 5

CITY OF Riverside PLANNING DEPARTMENT • 3900 Main Street • Riverside, California 92522

MERLE G. GARDNER
Planning Director

PLANNING DIVISION
782-5371

BUILDING DIVISION
782-5361

RECEIVED
SEP 20 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 20, 1989

Mr. Roger Streeter
Planning Director
Riverside County Planning Department
4080 Lemon Street
Riverside, CA 92501

Attn: David Mares

Subject: Notice of Preparation of a Draft EIR for the Eagle Mountain Project

Dear Mr. Streeter:

At its September 19, 1989 meeting, the Riverside City Council reviewed the above-referenced Notice of Preparation and, by a unanimous vote, took the following action:

1. Concurred with the list of topics proposed to be addressed in the DEIR for the Eagle Mountain Project;

2. Recommended that a supplemental EIR be prepared at the time specific Southern Pacific rail routes are identified and that the City be given the opportunity to review and comment on this document particularly as specific routes may affect the City of Riverside; and

We look forward to reviewing the draft EIR when available. Should you have any questions regarding this matter, please contact Stephen J. Whyld, Deputy Planning Director, at 782-5658.

Very truly yours,

Merle G. Gardner
Planning Director

MGG/2824Y(2)/c

ORANGE COUNTY CENTENNIAL

RECEIVED

SEP 25 1989

County of Orange

RIVERSIDE COUNTY
PLANNING DEPARTMENT

ENVIRONMENTAL MANAGEMENT AGENCY
PLANNING

ERNIE SCHNEIDER
DIRECTOR, EMA

MICHAEL M. RUANE
DIRECTOR OF PLANNING

LOCATION:
12 CIVIC CENTER PLAZA
SANTA ANA, CA

MAILING ADDRESS:
P.O. BOX 4048
SANTA ANA, CA 92702-4048

TELEPHONE:
(714) 834-4643
FAX #: 835-7425

SEP 20 1989

FILE NCL 89-84

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

SUBJECT: NOP for the Eagle Mountain Project

Dear Mr. Mares,

Thank you for the opportunity to respond to the above referenced item. The County of Orange has no comment at this time. However, we would appreciate being informed of any further developments.

If you have any questions or need to contact us, please call Kari Rigoni at (714) 834-2109.

Very truly yours,

Joan S. Golding, Manager
Advance Planning Division

By Kari G. Rigoni
Kari Rigoni, Sr. Planner

CH:tk(ldnc)
9092014513090

STATE OF CALIFORNIA

AIR RESOURCES BOARD
02 Q STREET
P.O. BOX 2815
SACRAMENTO, CA 95812

George Deukmejian, Governor

RECEIVED
SEP 25 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

September 20, 1989

Mr. David Mares
County of Riverside
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Dear Mr. Mares:

Notice Of Preparation - Riverside County Specific Plan No. 252, Zone Change No. 5499, CGPA No. 209/Eagle Mountain (SCH# 89081413)

We have reviewed the notice of preparation of a draft environmental impact report (EIR) for the Riverside County Specific Plan No. 252, Zone Change No. 5499, CGPA No. 209/Eagle Mountain Project. The notice of preparation states that the proposed project could result in detrimental effects on air quality. To enable adequate analysis of potential air quality impacts, we recommend that the draft EIR contain the following information:

1. A description of the proposed project including:

   a. Types and quantities of wastes to be handled;

   b. Technical information on storage, recycling, treatment, and disposal operations;

   c. Characterization of the landfill gas and any fuels to be used in the proposed project;

   d. Capacity and acceptance rate for the proposed sanitary landfill; and

   e. Expected date of start-up.

2. A description of the existing environmental setting at the proposed project site and adjacent areas including:

   a. Location;

   b. Meteorology and topography;

   c. Current background and onsite air quality, including information on ambient air concentrations of criteria and non-criteria pollutants;

d. Population distribution and the proximity of sensitive populations (e.g., residential areas, schools, hospitals);

e. Existing sources of air pollution in the vicinity of the proposed project; and

f. Identification of environmental pathways capable of bioaccumulating emissions.

3. An analysis of the potential air quality impacts due to proposed project activities including:

a. Construction of the project;

b. Vehicular traffic;

c. Operation of the sanitary landfill;

d. Transportation, storage, handling, treatment, recycling, or disposal of hazardous wastes; and

e. Accidental releases.

This analysis should include both criteria air pollutants for which ambient air quality standards exist and non-criteria air pollutants from the landfill and hazardous wastes. The analysis should also include estimates of average and highest controlled and uncontrolled emission rates of criteria and non-criteria air pollutants, and the basis for the assumptions and calculations used to determine these estimates.

4. An analysis of potential public exposure from the emission of non-criteria air pollutants.

5. A description of mitigation measures to minimize emissions. This discussion should include control equipment, process control, and other technical measures to reduce emissions of criteria and non-criteria air pollutants.

6. A description of similar emission sources proposed in California and the control requirements applicable to these sources.

7. Identification and description of all applicable federal, state, and local air pollution control regulations, and measures to comply with these regulations.

8. A description of alternatives to the proposed project and associated emissions of these alternatives.

We would also like to point out that the local air pollution control district may have jurisdiction over aspects of any proposed project and should have the opportunity to comment on material contained in the EIR.

We hope that a thorough discussion of the items listed in this letter will provide a better understanding of the air quality aspects of the proposed project and contribute to an effective EIR process. Thank you for the opportunity to participate in the preparation of this draft EIR. If you have questions regarding our comments or if we can be of further assistance, please contact Carole Cenci at (916) 322-6005.

Sincerely,

Jim Behrmann

Jim Behrmann, Manager
Toxics Program Support Section

cc: Mohsen Nazemi
South Coast AQMD

David Nunenkamp, OPR

STATE OF CALIFORNIA—BUSINESS AND TRANSPORTATION AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 11, P.O. BOX 85406, SAN DIEGO 92138-5406

September 22, 1989

11-RIV-177
2.2

David Mares
Riverside County Planning Department
46-209 Oasis Street, Room 304
Indio, CA 92201

Dear Mr. Mares:

Notice of Preparation of a DEIR for the
Eagle Mountain Project - SCH 89081413

Caltrans District 11 will probably not have a responsible agency role in the preparation of this EIR. We are interested, however, in the impacts of project generated traffic to Interstate Route 10 and State Route 177. The discussion of those impacts should include the potential conflict between increased vehicular traffic, primarily trucks, and bicycle riders.

Our contact person for this area is Richard Coward, Project Manager, Project Services Branch, (619) 237-7377.

Sincerely,

JESUS M. GARCIA
District Director

By M. O

for JAMES T. CHESHIRE, Chief
Environmental Planning Branch

MO:yg

RECEIVED
SEP 25 1989

September 25, 1989

MRC/EAGLE MOUNTAIN
TRASH-BY-RAIL
DRAFT/FINAL EIR
PUBLIC COMMENT

Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501
Roger Streeter, Planning Director
Ron Goldman, Chief Planner
David Mares, Planner

Dear Gentlemen:

In a recent conversation, by telephone, with Dave Mares, we were told to submit comments to your office regarding the proposed "Trash-By-Rail/Eagle Mountain project. We are sending you concerns and comments which we, as residents of the San Gorgonio Pass and Coachella Valley, would like addressed in the draft and final versions of the Environmental Impact Report, as mandated by the California Environmental Quality Act. We find it incredible that the County of Riverside is even considering such an idea (for this type of project) for 100 years. Shipping Los Angeles Orange, San Diego, other? county trash through and to Riverside County for $10 to $30 million dollars a year is not a reason to put Riverside County "up for sale". $440,000 to the Desert Center area does not mean that we are all for sale. That trash will go through our communities daily! We reject the approval of the memorandum of understanding with Mine Reclamation Corp. by the Riverside County Board of Supervisors that declares the County's intention to permit the disposal of L.A. County waste at Eagle Mountain. We question their right to enter into such an agreement.

We are fully aware that serious public controversy, under CEQA, could and should reject this project. We would like to now state, for the record, that we oppose any type of refuse, waste, trash or rubbish, both so-called household or toxic/hazardous and radioactive from anywhere outside of Riverside County, by any means of transportation, through and to Riverside County, for any means of disposal, burial or incineration anywhere in Riverside County.

As of September 1, 1989, the Bureau of Land Management had not accepted the role as co-lead agency in the project, Mr. Mares said. Has that agency (BLM) now accepted? What is the name of the person in charge at the BLM? If the BLM is not yet on board or chooses not to become involved in the project, could you please send us that information? Who, from the County is in charge as lead and/or co-lead? What company will do the EIR? Who is in charge? Who hired the company for the EIR and who will pay the bill? Also, what initiated this project? Was it a study by someone or some agency? Was it Kaiser Steel Resources, Southern California Association of Governments, The Santa Fe Railway Company, the Mine Reclamation Corporation? Others? We would like the names of the persons and companies, dates of proposals and the proposals showing Riverside County sites and routes, as well as any other information explaining how this proposed project originated.

How does it happen that the San Gabriel Valley cities feel so positive about this "Trash-by-Train" proposition that they are already organizing cities along the way to sign up for the long haul?

This portion of our comments, questions and concerns should be included with the following numbered items in the draft and final EIR as Resident/ Citizen public comment on the proposed project.

COMMENTS, QUESTIONS AND CONCERNS RE: TRASH BY TRAIN

1. State Department of Health Services officials recently reversed a decision requiring an EIR and approved plans to build a controversial toxic waste incinerator in Vernon, CA without an Environmental Impact Report. Who has final jurisdiction for the Mine Reclamation/Eagle Mountain trash by train proposal and could anyone for any reason dispense with the EIR?
2. Governor George Deukmejian and legislative leaders tentatively agreed on Sept. 5, 1989 to include incineration as part of a long term strategy to reduce solid waste in California by 50% before the year 2000. What guarantee will be provided that incineration will not become a part of "Trash by Train project now or in the future with Riverside County as the major holder of So. California trash if this project is approved?
3. Is there a plan for Los Angeles, Orange, SanDiego and other county trash, refuse etc. to be collected and separated at sites in Riverside County? or will trains be fully loaded upon entering Riverside Co.? We oppose Riv. Co. separation/loading sites.
4. Municipal refuse is known to contain toxic and hazardous materials, industrial, hospital and medical waste (some radioactive). By what method will this refuse be separated, identified and processed into non-toxic trash for transport to the Eagle Mountain site? Describe in detail, please.
5. Where will collection and separation sites be located?
6. What local, county, state, federal regulations will be used to insure (guarantee) that refuse is solid and non-toxic? Name the agencies that will monitor, inspect and have jurisdiction. How often will monitoring take place? What would the penalties be for violations? Please show plans for test wells and other monitoring devices at dump-site. We feel that once toxity shows up in test wells it is too late to stop further contamination.
7. Would Mine Reclamation use sub-contractors, under which jurisdiction, to collect, separate, monitor, load and transport refuse to Eagle Mt.?
8. To assure that this quick-fix, trash-by-rail scheme will not promote future trash accumulation (instead of curbing it) each city and county area producing refuse proposed for inclusion in this plan must submit recycling plans and ordinances based on current and projected population. Plans should reflect the entire time of contract for each city or county area. Projections should include breakdown in total tonnage of paper, plastic, glass, etc. Cities and counties not submitting recycling plans and trash projections should be refused access to the project.
9. All land-fills and dumps sooner or later produce toxic gases from decaying trash. How will toxic gas be eliminated from the Eagle Mt. site? How will flora and fauna and surrounding environment be affected? Describe in detail how gas will be eliminated from this site.
10. How would refuse be contained for shipment? Would containers be used only for trash transport or will other used be permitted on return trip?
11. Will chemical or other repellents be used? Will pesticides be required for insect and rodent control? for flies? Will pesticides be used on containers, rail cars, at collection, separation and loading sites and at dump-site at Eagle Mt. Please describe in detail.
12. Estimate in time loaded trains could be delayed on sidings or tracks in the San Gorgonio Pass and Coachella Valley areas. Explain and

describe occurances and describe in detail all impacts to immediate and surrounding areas.

13. Describe in detail the terms waste, trash, refuse, rubbish and list all ingredients per term.
14. In case of earthquake, train wreck/accident, fire, flood or other event causing rail transport stoppage enroute to dump, how will refuse be transported to Eagle Mountain site? Describe emergency plans for each event.
15. Cite least and worst case scenario for accident enroute to Eagle Mt. site. Give mitigation measures. Show response plan for all points enroute.
16. Cite least and worst case scenario for accident, ground water contamination, other air, land, water pollution and contamination to Eagle Mountain site and surrounding area. Give mitigation measures. Show response time.
17. Describe in detail responsibility and liability of Mine Reclamation Corp., BLM, Riverside County, Kaiser Steel Resourses, Southern California Association of Governments, Santa Fe Railway, San Gabriel Association of Cities, County, State, Federal Government agencies should the Public and/or the environment be damaged by any or all phases of this project. Show liability and responsibility for each year of total contract including dollar figures for each entity for each year.
18. In case of damage to public or environment, now or in the future, a pool of money must be on hand so that work for clean-up is not delayed while various parties and agencies quibble about who is going to pay. The tax-paying public should not be responsible for clean-up of the environment or damage to the public resulting from any phase of the trash-by-train project including contamination on or off site at Eagle Mountain and its impact on surrounding communities and desert environs. Show individual assets of all companies involved and how much will beset aside for this fund by each one.
19. Is a similar proposal for trash-by-train at the Morongo Indian Reservation at the eastern limit of the city of Banning a part of this project? If so, please describe and explain.
20. What tonnage per day will be transported and deposited at the beginning of project? What estimate of tonnage per day in 100 years at end of project?
21. The Riverside County backed Pass Area Community Plan, now in development, should be included in all trash-by-train studies and decisions.
22. Bullet train and Commuter service on existing rail lines is now being studied and proposed for So. California. Railroad rights of way are being considered for purchase for this purpose. Residents of the San Gorgonio Pass and the Coachella Valley strongly support commuter rail service linking the desert to communities on the coast and to the north and south. They much prefer riding those rails themselves rather than watching L.A. trash take the ride near their homes. Describe in detail how the Mine Reclamation/Eagle Mountain trash-by-train will impact future commuter-rail routes and services.
23. Will trash cars be added to trains already travelling or will they be on trains for the specific purpose of hauling trash?
24. Describe how this will impact future oommuter service and proposed bullet train service if trash"trains do their hauling at night, empty their loads, then return for more trash in an endless chain" as stated in a recent Los Angeles Times front page story. Show impact of constant shaking and effect on foundations of homes and commercial buildings and the Westinghouse nuclear facility. Describe impact to cities with housing in close

proximity to those tracks. What effect will this have on property values? What will be done to lesson noise pollution?

25. This Draft and Final EIR should require input from all cities on route. All comments should be carefully considered before making a decision on this project.
26. Describe in detail how trash-by-train will impact missles-by-rail now being developed by the Department of Defense. Give estimates for impact and mitigation for 100 year period.
27. Describe in detail impacts to the California Desert Protection Act (as proposed) and other desert conservation and wilderness projects now in place or proposed for the future. We request that Jim Dobson, Director, California Desert Protection League, Los Angeles; Alan Cranston, U.S. Senator, CA.; The National Park Service; and Jeff Widen, California Desert Coordinator of the Sierra Club be contacted for input into the EIR.
28. Are existing rights of way to be used for trash-by-train, or will new routes and tracks be needed?

Thank you!

Sincerely,

Dollie M. Irwin

Dollie Irwin
420 N. Morongo
Banning, CA 92220

Carolyn Toenjes

Carolyn Toenjes
1863 Park Drive
Palm Springs, CA 92262

County of Riverside
ROAD AND SURVEY DEPARTMENT

LeRoy D. Smoot
ROAD COMMISSIONER & COUNTY SURVEYOR

COUNTY ADMINISTRATIVE CENTER
MAILING ADDRESS
P.O. BOX 1090
RIVERSIDE, CALIFORNIA 92502
(714) 787-6554

RECEIVED
AUG 17 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 14, 1989

Mr. Roger S. Streeter, Planning Director
County Administrative Center
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Attention: Mr. David Mares, Planner III

RE: CGPA No. 209/COZ No. 5499
SP No. 252/Eagle Mountain
Project/NOP

Dear Mr. Mares:

The Riverside County Road Department, Road Planning Division has received your Notice of Preparation for the above referenced project. Please include the following information in the DEIR.

1. The GVW of the trucks and railroad cars to be used on the circulation network.

2. Depict on the map the points of egress, ingress, and all off-site haul routes on the County roads.

3. Study shall identify and depict all mitigative measures including reclamation plans for the proposed site.

4. Peak season trips, the amount of projected trips per hour within a twenty four hour day.

5. A detailed traffic study of existing and future Average Daily Traffic Volumes, including peak hours, and Intersection Capacity Utilization Analysis of any intersection within one mile of the proposed site.

6. Discuss the future proposed uses on the property and the impact on the street system.

Care should be taken when developing the property to preserve and perpetuate the existing drainage pattern of the County road.

Any work conducted within the County road right-of-way will require an encroachment permit.

If you have any questions regarding this matter, please contact John Goodlett at (714) 787-1445.

Yours truly,

Lawrence A. Toerper
Road Division Engineer

LAT:jw

BREA
CALIFORNIA
City of Brea

RECEIVED
AUG 21 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 16, 1989

Mr. David Mares, Planner III
Riverside County Planning Department
4080 Lemon St. 9 th Floor
Riverside, Ca. 92501

Dear Mr. Mares,

We would like to thank you for the opportunity to review the Notice of Preparation of the Environmental Impact Report for Specific Plan No. 252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 209/ Eagle Mountain Project. The scope of the EIR as outlined in the NOP appears adequate, and we are looking forward to receiving a copy of the Draft EIR when it becomes available. Thank you again.

Sincerly,

Jennifer A. Lilley
Planning Intern

RECEIVED
AUG 21 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

SOUTHERN CALIFORNIA gas COMPANY

1981 LUGONIA AVENUE, REDLANDS, CALIFORNIA

MAILING ADDRESS. P O BOX 3003. REDLANDS, CALIFORNIA 92373-0306

August 17, 1989

Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverisde, CA 92501

ATTENTION: David Mares

RE: Specific Plan #252

The Southern California Gas Company has a gas main in Kaiser Road near the project. Distribution lines could be extended from these mains to serve the proposed development without any significant impact on the environment. The service would be in accordance with the Company's policies and extension rules on file with the California Public Utilities Commission at the time contractual arrangements are made.

The availability of natural gas service, as set forth in this letter, is based upon present conditions of gas supply and regulatory policies. As a public utility, the Southern California Gas Company is under the jurisdiction of the California Public Utilities Commission. We can also be affected by actions of federal regulatory agencies. Should these agencies take any action which affects gas supply or the conditions under which service is available, gas service will be provided in accordance with revised conditions.

Typical demand use for:

a. Residential (System Area Average/Use Per Meter) Yearly

Single Family	799 therms/year dwelling unit
Multi-Family 4 or less units	482 therms/year dwelling unit
Multi-Family 5 or more units	483 therms/year dwelling unit

These averages are based on total gas consumption in residential units served by Southern California Gas Company, and it should not be implied that any particular home, apartment or tract of homes will use these amounts of energy.

b. Commercial

Due to the fact that construction varies so widely (a glass building vs. a heavily insulated building) and there is such a wide variation in types of materials and equipment used, a typical demand figure is not available for this type of construction. Calculations would need to be made after the building has been designed.

To insure the existing facilities are adequate to accommodate the new development, an engineering study will be required. Detailed information including tract maps and plot plans must be submitted to the Gas Company Market Services Representative, 1-800-624-2497, six months prior to the actual construction of the natural gas pipeline.

We have developed several programs which are available, upon request, to provide assistance in selecting the most effective applications of energy conservation techniques for a particular project. If you desire further information on any of our energy conservation programs, please contact our Area Market Services Manager, P.O. Box 3003, Redlands, CA 92373-0306, phone 1-800-624-2497.

Sincerely,

R L Baughman

Roger L. Baughman
Technical Supervisor

RLB:vjs

cc: Environ Affairs - ML209B

NI

ƎND MANAGEMENT DEPARTMENT

North Arrowhead Avenue • San Bernardino, CA 92415-0180 • (714) 387-4099

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
PUBLIC WORKS AGENCY

JOHN N. JAQUESS
Land Management Director

OFFICE OF PLANNING
Sharon W. Hightower
County Planning Officer

OFFICE OF SURVEYOR
Claude D. Tomlinson, L.S.
County Surveyor

OFFICE OF BUILDING AND SAFETY
Larry L. Schoelkopf, P.E.
County Building Official

RECEIVED
AUG 21 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 17, 1989

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: Notice of Preparation (NOP) of a Draft Environmental Impact Report on the Eagle Mountain Project

Dear Mr. Mares,

We have reviewed the Notice of Preparation for the Eagle Mountain Project, which is stated to include a Specific Plan, a General Plan Amendment, and a Zone Change. The proposed project involves a regional Class III solid waste disposal site and recycling facility with associated operations, a railroad equipment maintenance and repair center, renewal of mining operations, and the continuance/expansion of existing uses in the 9,600-acre project area. The NOP does not indicate whether approval or modification of a mining reclamation plan pursuant to the Surface Mining and Reclamation Act is also being requested.

We have no comments on the proposed scope of the EIR at this time, although it is unclear whether some of the information items discussed in Section V of the Environmental Assessment (e.g., cultural and paleontologic resources) are to be addressed in the EIR, as they are not listed in the "Summary of Potential Environmental Impacts" table. When the Draft EIR is circulated, we will provide comments on its analysis and recommendations, both from this and from other affected County departments. Please place this office on your mailing list for the Draft Environmental Impact Report. We would appreciate receiving two copies of the Draft EIR and all supporting documents, if possible.

Thank you for the opportunity to comment on the Notice of Preparation. We look forward to reviewing the Draft EIR.

Sincerely,

OFFICE OF PLANNING

Michael K. Lerch

MICHAEL K. LERCH, SENIOR PLANNER
ENVIRONMENTAL ANALYSIS TEAM

cc: John Jaquess, Land Management Department
Sharon Hightower, Planning Officer
William Sterling, Solid Waste Management Department

CITY OF BRAWLEY

CITY HALL
400 MAIN ST. · PLAZA PARK
BRAWLEY, CALIFORNIA
92227
PHONE: 344-1550

RECEIVED
AUG 25 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 22, 1989

David Mares, Planner
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: Notice of Preparation for Draft EIR
for Eagle Mountain Project

Dear Mr. Mares:

The Brawley Department of Economic and Community Development has reviewed the Notice of Preparation for the Eagle Mountain Project Draft Environmental Impact Report.

The Department is concerned with two items, impacts from increased rail traffic and impacts on air quality in the Southeast Desert Air Basin, both of which have been identified in the environmental assessment.

We appreciate the opportunity to comment on this project and look forward to reviewing the Draft EIR for a more completed impact analysis.

Sincerely,

Mary Beth Ormsby,
Community Development Planner

MBO:mnv

SAN BERNARDINO COUNTY MUSEUM

4 Orange Tree Lane • Redlands, CA 92374
(714) 792-1334 • 792-0052 • 825-4825 • 825-4823

COUNTY OF SAN BERNARDINO
GENERAL SERVICES AGENCY

DR. ALLAN D. GRIESEMER
Director

RECEIVED
AUG 28 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 22, 1989

David Mares, Planner III
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, CA 92501

re: SPECIFIC PLAN NO. 252, ZONE CHANGE 5477, COMPREHENSIVE GENERAL PALN AMENDMENT NO. 209, EAGLE MOUNTAIN PROJECT

Dear Mr. Mares,

The Notice of Preparation correctly indicates that paleontologic resources need to be addressed. An adequate program to mitigation impacts to nonrenewable paleontologic resources should include, but not necessarily be limited to, the following:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. The monitor should be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments which are likely to contain the remains of small fossil mammals. The monitor must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.
2. Preparation of recovered specimens to a point of identification, including washing of sediments to recover small vertebrates.
3. Identification and curation of specimens into a museum repository with retrievable storage.
4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency, signifies completion of the Plan to Mitigate Impacts to Paleontologic Resources.

Sincerely,

Allan D. Griesemer

Dr. Allan D. Griesemer
Museums Director

ADG:RER/jr

PD

RIVERSIDE COUNTY

COIS BYRD, SHERIFF

Sheriff

82-695 DR. CARREON BLVD. • INDIO, CA 92201 • (619) 342-8990

August 23, 1989

Mr. David Mares
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside CA 92501

RE: Specific Plan No. 252,
Zone change No. 5499,
Comprehensive General Plan
Amendment No. 209/Eagle
Mountain Project

Dear Mr. Mares:

Regarding the above mentioned project we do not anticipate any significant impact on the Sheriff's Department's ability to provide police services. As the site is remote in its location, the area is not routinely patrolled. Response to called for services will normally result in a delay of 30-45 minutes driving time from the Indio area.

Regarding Project Design - Consideration toward site and equipment security should involve either fencing the area being utilized or maintaining private security personnel on premises or both.

We appreciate the opportunity to comment on the project from a law enforcement point of view.

Sincerely,

COIS BYRD, SHERIFF

Robert Doyle

Robert Doyle, Captain
Indio Station Commander

gt

Thank you for the opportunity to comment on the potential environmental impact which this project may have on the City of Whittier. Should you require further information, please contact me at (213) 945-8214.

Sincerely,

Neil K. Hudson
Director of Public Services

cc: Elvin Porter
Director of Planning

NKH:rt

CITY OF WHITTIER

13230 EAST PENN STREET, WHITTIER, CALIFORNIA 90602-1772 (213) 945

RECEIVED
SEP 01 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 28, 1989

Riverside County
Planning Department
4080 Lemon Street, 9th Floor
Riverside, California 92581

Attention: Mr. David Mares, Planning Director

Subject: Notice of Preparation in re: Eagle Mountain Project

Dear Mr. Mares:

This is in response to your letter dated August 15, 1989, inviting comments regarding the Eagle Mountain Project. Essentially, that project entails the transportation of waste by rail from the Los Angeles metropolitan area to transfer stations to be situated at various locations in Southern California, presumably in the direction of the proposed Class III landfill which is to be sited in the vicinity of the Kaiser Eagle Mountain Iron Mine.

It is understood that the focus of your agency's environmental impact report is on the transportation of waste by rail along Southern Pacific lines. As you may be aware, a Southern Pacific railroad line runs through the southern portion of the City of Whittier.

Should that rail line be used to transport refuse to Eagle Mountain, the City would be interested in knowing what measures will be or have been considered to mitigate strewn trash, vector, and odor problems that could result in the event of a derailment or a mechanical failure which would immobilize the train within City limits.

LA HABRA
ALL AMERICA CITY
CITY of La Habra
CIVIC CENTER
P.O. BOX 337
201 E. LA HABRA BLVD.
LA HABRA, CALIFORNIA 90633-0337
(213) 905-9700
FAX (213) 905-9719

August 29, 1989

Mr. David Mares
Project Planner
Riverside County Planning Department
4080 Lemon Street, 9th Floor
Riverside, California 92501

Re: Specific Plan No.252, Zone Change No. 5499, Comprehensive General Plan Amendment No. 209/Eagle Mountain Project.

Dear Mr. Mares,

The City of La Habra would not have any comments at this time regarding the preperation of an Environmental Impact Report for the subject project. We would appreciate receiving a Draft copy of the Environmental Impact Report for our review and comment.

If you should have any questions, please feel free to contact me at (213) 905-9724.

Sincerely,

Carlos Jaramillo
City Planner

W, PP, AQ, B, L

Laurence and Donna Charpie
P.O. Box 321
Desert Center, Ca. 92239
August 30, 1989

Re : Information to be included in the EIR/EIS

To Whom It May Concern,

Enclosed are many documents discussing the tailings ponds and water status at the defunct Kaiser Steel mine, in Eagle Mountain, California. We will number and briefly discuss the significance of each document enclosed.

1. Document dated September 20,1978 :
This shows, although the water does not meet Federal Health Standards, the water could be treated and made potable.

2. Document dated December 9,1976 :
After being inspected by the Water Quality Control Board, Kaiser recei a note stating they will get an order to be inspected by the Dam Safety Engineer before Pond No. 7 is approved. In the margin, Mr. Wick wrote "We will ignore this." We feel this poses the question of Kaiser's credibility.

3. Document dated March 14, 1969 :
This is an accounting for water loss in the pond. The amount of net water, not accounted for is 432 acre feet. Please note, evaporation was accounted for, implying 432 acre feet permeated into the ground strata. What conclusion would make for the 432 acre feet of water not accounted for ?

4. Document dated March 20, 1969 :
This document from the Colorado River Basin Regional Water Quality Control Board shows the inconsistencies made by Kaiser's engineers in their water balance report for the existing tailings basin for the year 1968.

5. Document dated March 31, 1969 :
This document refutes the letter from Mr. Swajan of March 20, 1969. It states a lining will be placed to assure minimum seepage. However, we believe, a project to dump 16,000 tons of garbage a day should be 100% contained, any seepage is environmentally unacceptable.

6. Document dated April 8, 1968 :
This is a permeability study on the slime. The conclusion states,"It may be concluded from the test work to date that some percolation definitely does take place." Also, this report states the slime water is excessively high in sulfate-ions. It is ironic, MRC and Kaiser propose to use a hazardous cover to protect our precious water. What do you think the ramifications of this will be ?

7. Document dated June 12, 1969 :
Discussed in this is seepage control. It is admitted, seepage is hard to detect. "In addition, the time lag between discharge or seepage and detection of degradation of ground water is great, and usually irreversible by the time degradation is detected."

8. Document dated July 12, 1968 :
Pinto No. 2 water level. Since the ground level at well head equals 1,081 feet, the water table level therefore is very high, historically

9.Document dated September 26, 1968 :
A report stating, "A 3 foot blanket of tailings at 25% moisture would control seepage rate not over 5.5 acre feet per year per acre, with a pond height of 80 feet." The height of the East Pit is 1,500 feet, many times higher than 80 feet. It has been estimated, 1% of the 16,000 tons of garbage is moisture. With the East Pit height, and moisture content considered, is it possible the seepage will be greater?

10.Document dated December 17, 1967 :
The Department of Water Resources outlines in detail, a review of Kaiser's report, "Fine Tailings Disposal, Water Recovery and Loss Report For a Six Month Period." There is a paragraph, "Direct subsurface observations" which should be carefully considered. MRC has already drilled about 4 wells to monitor infiltration. This section speaks of detailed information on the physical characteristics and location and extent of all pervious and impervious materials in the unsaturated zone. How did MRC determine where to put the monitoring wells ?

11.Document dated February 17, 1965 :
Date of pumpage in Pinto Basin by Kaiser. (1960-1965) Also attached is a graph of monthly pumpage and Depth to Water in feet below land surface, prepared by U.S. Geological Survey. It states, in 1958, the water level was approximately 155 feet below the surface. According to the Department of Water Resources Bulletin No. 118, September 1975, a map of the Colorado Desert Hydrological Study Area, page 84, shows the underground aquifers are all inter-connected. This means a possible contamination of 9.1 million acre feet of water. Also, The Riverside Hazardous Waste Management Plan Draft of March 21, 1988, page 85. "Facilities with subsurface storage or treatment shall not be sited where the historically highest ground water is 30 feet from the bottom of the waste containment structure." Does this, or similar criteria apply to solid waste disposal ?

12.Document dated June 18, 1964 :
This is a document of water analysis. The conclusion is the water does not meet U.S. Public Health Services drinking standards, however, it is not too bad and can be made suitable for drinking by proper dilution (or treatment). This is just further citing that water can be made potable. With the water crisis currently in this country, it behooves us to protect the available water from contamination.

This concludes the section on documents from Kaiser Steel. Now we will address the large map. This survey was done by a company in Tucson, Arizona in 1981, of the East Pit. It clearly states the water level to be 744 feet. The management of Kaiser Steel, namely, Jerry Fawcett and Orlo Anderson, contend the water, that was in the East Pit, was from wet tailings, and occurred after mining operations had ceased. We have several rebuttals to this statement :

1. In personal conversations with former Kaiser employees, we were told they had actually dug into the water table. They went on to say, the East Pit is still rich in ore, however, in trying to continue mining, efforts were counter-productive because their shovels would literally sink. We were told, as fast as Kaiser would pump water out, it would recover. One person who made these statements is Walt Hopkins, who still resides in Desert Center. James Capp, a former electrician with Kaiser, told us he worked on the pumps to get the water out. James Capp also resides in Desert Center.

2. It is rumored, Kaiser has signed a 30 year contract with a company who will extract precious metals from the tailings, using large volumes of water and chemicals. These are the same tailings planned to be used to cover the garbage. If what Jerry Fawcett and Orlo Anderson say about the water in the East Pit is true, isn't this making the same mistake twice ? Also, where would the contaminated water go ? And, what will the chemicals being used do to the air quality ? We have tried to find out the name of this company, but unsuccessfully. Perhaps you can obtain this information.

There are several letters enclosed, showing Kaiser Steel's blatant disregard for human safety and the environment. On July 6, 1989, there was a fire at Eagle Mountain. The thick black smoke travelled right over the East Pit, and made it's way to the MWD open aquaduct. Letters enclosed to Mr. Joe Asbury from the Riverside Environmental Health Office, and to Mr. Ed Pupka, Supervisor of the Hazardous Materials Unit, are accounting for the days following the fire. The records requested from the Health Department are enclosed. They clearly show PCB's and other hazardous materi: are being stored at Kaiser, beyond the 90 days allotted. It seems curious, Kaiser has done nothing with these items, until the fire occurred. What if there was no fire ? What were their plans for these items, before the Health Department inspected them and told them to comply with the hazardous disposal laws ? We are not satisfied with how the Health Department handled this. Other proof of PCB's in the July 6th fire, is an inter-office memo from MTC, dated 7/11/89. Also enclosed, is a letter written by Michael Uebersohn, a former Kaiser employee, stating the lack of safety standards by Kaiser Steel.

There is a question of Kaiser dumping household garbage into the East Pit before the landfill project has been approved. As part of the EIR/EIS, we request you excavate, to an appropriate depth, or do bore samples in the pit, to ascertain if garbage is in fact present. If there is buried garbag will Kaiser Steel be instructed to remove, and properly dispose of it, at their expense ? If Kaiser is disregarding Health and Safety Standards now, how can we trust them to be involved with a landfill with a life expectancy of 100 years ? Please include Kaiser's credibility in the EIR/EIS.

We understand, MRC has a 99 year lease with Kaiser Steel, involving approximately 8,300 acres. There are three huge pits on this property, the East Pit, Central Pit, and the West Pit. MRC is talking only of using the East Pit. What plans are in the future for the other two pits ? Is there a possibility they will be used for chemical, toxic, or radioactive waste ?

Air quality must now be addressed. What would the breaking down of 16,000 tons of garbage a day do to the air ? Is it realistic to assume the methane capture system will deal with 100% of emissions ? Also, MRC propos to have 200 trucks a day to be employed. How will the truck emissions, coupled with the decomposing garbage affect our air quality ? Also, a by-product of diesel fuel is formaldehyde, how would that affect the air ? When there are agricultural burns in the valley, sometimes the smoke linger for several days. We are really interested in what your studies will conclude in regards to air quality.

Also, we would like a study on the bighorn sheep that inhabit Eagle Mountain. On June 22, 1989, two bighorn sheep were on my neighbor's Jojoba farm, drinking water and browsing on the bushes. We talked to several long time residents, who said the sheep never leave the mountain and come down into the valley. How will the landfill affect their habitat ? Will they leave the area?

Lastly, the EIR/EIS should do a report on the Jojoba plants, native to the area. In 1983, Congress included Jojoba in the Critical Agricultural Materials List. It is written in the Critical Agricultural Materials Report, "The committee recognizes that the development of a domestic industry or industries for production and manufacture from native agricultural crops, other than rubber, which are of strategic and industrial importance but for which the Nation is now dependent upon foreign sources would benefit the economy, the defense and the general well being of the Nation and additional efforts in this area should be undertaken or continued and expanded."

Furthermore, Jojoba is native only to the Sonoran Desert. If water becomes contaminated, what wouldthis do to the quality of this superior oil ? There are many acres under cultivation in the valley, and we think they warrant being included in the EIR/EIS. There are volumes dedicated to the analysis of Jojoba oil, from industrial applications to pharmaceuticals.

In closing, we think we covered everything we would like included in the EIR/EIS. It is very important to us, being land owners, that we know all angles of this proposal are covered. The elevation of our land is 760 feet, the elevation of the bottom of the East Pit is also 760. Is it fair to assume since we are approximately 4 miles downstream of the pit, that we would be the first to be contaminated, if there was groundwater intrusion ? If this proposal is permitted, we will have to accept and live with it, knowing an extremely prudent study on the environment was conducted. We also have the right to be informed, therefore, please send us a copy of the reports to keep us up to date. Thank you very much for your time and energy.

Sincerely,

Laurence R. Charpied Laurence R Charpied

Donna J. Charpied Donna J. Charpied

Information about Kaiser Eagle Mountain, Inc. August 23, 1989

To Whom It May Concern,

1. The day after the fire in the building, at the mine on Eagle Mountain, (July 7, 1989), Riverside County Hazardous Materials Unit came to inspect alleged PCB leakage. They found some electrical capacitors on the floors of the building, which had been on fire the day before, that appeared to be leaking. They ordered Kaiser Eagle Mountain Inc. / Kaiser Steel Resources to remove and dispose of the capacitors, containing PCB's, and clean up of the area must be done.
   Jerry Stokes, agent for Kaiser, my boss at the time, and the person HAZMAT talked to, informed me that HAZMAT's order, "was no big deal." The procedure was, as told to me by my boss, outlined by HAZMAT, and had to be followed to the letter. Kaiser could not even start clean up until my boss got special materials, ordered by HAZMAT to do the clean up.
   I wasn't there when the clean up was done. But, after I did some checking, I found out that Jerry, in completing the ordered clean up, only removed the capacitors in the building.

2. Kaiser, some time ago, started renting to the general public. If you rented a house from Kaiser, you could have garbage pick up, once a week for only $8.00 a month. When our guys picked up the garbage every Monday from the houses Kaiser had rented and houses Kaiser employees lived in, the garbage was then dumped into the East Pit.
   It was the day after MRC's head guys were up at Eagle Mountain for a meeting and a tour, that the employees of Kaiser were told that no household garbage could be put into the East Pit. The reason we were told was the East Pit was not yet approved to be a landfill. We were told that anything else could be dumped into the East Pit, as long as it wasn't household garbage.
   On August 16, 1989, I was informed by a Kaiser employee, they now cannc dump anything into the East Pit. Kaiser is now taking everything to the Riverside County Landfill, down the road. It just seems "funny" that for months it was okay to dump into the East Pit, but now it is not.

3. Kaiser was planning to reopen the Pinto Well, due to the increase of population at Eagle Mountain. Kaiser wanted to make sure they had enough water to supply Eagle Mountain. A crew was sent out to the well, only to check on how much money and work it would take to get Pinto back on line. The crew that went out there found everything was ripped apart. Someone was trying to pull all the copper out of everything. Now one thin they did take, was the copper plates, out of three transformers, they had out at Pinto Well. It just so happened, these three transformers containe PCB's. Then Kaiser had two employees go out and drain most of the PCB's out of the transformers at Pinto. But not all, someone ended up breaking and smashing these transformers, to get the copper plates.
   Jerry Stokes knew, about a year now, some kind of clean up had to be do Yet, up until now, nothing has been done. Now I am hearing from differen people that this just happened last week. But I **KNOW**, and believe that he is only saying that to cover up for what he should have done almost a year ago.

4. I started to work for Kaiser in May 1988. Right after I started, Jerry Stokes found out, somehow, that an inspector was coming to check on PCB's. So, for a good week, all of us employees of Kaiser spent our time washing down all the transformers. The idea behind this was, when the inspector

looks at them he can't see the PCB's leaking from them, which he couldn't because we just washed them away.

I just believe that these are just a few things that someone should look into. I guess what makes me think is, in the future, Kaiser plans some big projects for Eagle Mountain. But, right now they can't handle or comply with what they are to do, and there is nothing here. What are they going to do when there is something big here ?!?

Sincerely,

Michael J. Uebersohn

(619) ~~392-4333~~
(619) 227-5373 new #

Donna Charpied
P.O. Box 321
Desert Center, Ca.
92239
July 13, 1989

Supervisor Ed Pupka
Hazardous Materials Unit
9150 Flair Drive
El Monte, Ca. 91731

Dear Mr. Pupka,

I have had telephone communications with you and your office, (Mr. Mohan), regarding the fire at Kaiser Steel's defunct iron ore mine, located at Eagle Mountain, California.

To refresh your memory, the fire occured on July 6, 1989. It was not until July 7th that I learned there were transformers involved. I spoke to Mr. Jerry Stokes on the 7th about the incident. He said, "Do you want to know the truth ? There were 17 capacitors in the building that burned." He said, "There were no transform I spoke with you on July 10th. You had Mr, Mohan inspect the area that morning. You informed me, Mr. Mohan's report did state there were transformers in the fire.

My husband was told by one of the volunteer firemen, that transformers were stor on one of the floors, partially lined with plastic in case any would leak. He went on to say the fire was so hot, they had to let it burn itself out.

On July 11th, I made an appointment to discuss this with Mr. Jerry Stokes and Mr. Crl Anderson. For reasons unkown to me, Mr. Anderson did not sit in on the session, as he previously said, he was however, in the office complex. I asked Mr. Stokes abou the transformers. He said, "There are no transformers." I said , "Great ! What I would like from you is a copy of the permits from the hazardous waste unit who trar ported the transformers to an approved disposal site." Mr. Stokes said, "I refuse to show you that information, I am not required by law to do so." I said, "Jerry, please think carefully, and consider your answer, and I repeated my request." He said, "I don't have to show that to you unless the EPA or Jerry Fawcett instructs me to." I terminated our meeting.

Mr. Pupka, my husband works for the Return to Custody Facility, located at Eagl Mountain, for the past 16 months. He was a guard during the construction of the facility. He told me, when they were taking down the telephone poles, he saw abou 25 transformers, that Kaiser removed from the poles. I know by law, Kaiser had 90 days to dispose of them, or have the hazardous waste team come out and remove the PCB's inside. What Happened to them ?

I am formally requesting you to send me copies of the permits, proving Kaiser did in fact follow the hazardous waste disposal requirements. If there are no records of this, then where are the transformers ? Also, would you please send me a copy of Mr. Mohan's report of July 10th ? I have also written to Mr. Joe Asbury of the Riverside Environmental Health Office.

In closing, I would like to thank you and your co-workers for your time, information, and energy you have given to this matter. I await your reply.

Respectfully,

Donna Charpied

Donna Charpied

Donna Charpied
P.O. Box 321
Desert Center, Ca.
92239
July 13, 1989

Mr. Joe Asbury
Riverside Environmental Health Office
3111 E. Taquitz-McCallum
Palm Springs, Ca. 92262

Dear Mr. Asbury,

On July 6, 1989, there was a fire at Kaiser Steel's Eagle Mountain iron ore mine. It was not until the next day that I learned transformers burned in that fire. I called the hazardous waste management unit, in El Monte California, and was told there was no report of a possible contaminated fire. This was almost 24 hours after the fire.

My husband was told, by one of the valunteer firemen, that one of the floors of the burning building was a storage area for transformers removed from the defunct mine. He went on to say the room was partially line with plastic, in case the transformers would leak. Also, the fire was so hot, they had to let it burn itself out.

On July 7th, I telephoned the Kaiser office, and spoke to Mr. Jerry Stokes. He said there were no transformers involved. He said, "If you want to know the truth, there were only 17 capacitors stored in the room." We then went to MWD and spoke with Mr. Tex Moody, who said this was not reported to them. The black smoke from this fire went right over MWD's open water canals.

On July 10th, I telephoned the hazardous waste management unit, and spoke to Mr. Ed Pupka. His office had gone to the area to inspect the incident that morning. The report was some transformers were in fact in the fire.

On July 11th, I made an appointment to discuss this with Mr. Jerry Stokes and Mr Orlo Anderson. For reasons unknown to me, Mr. Anderson did not sit in on the sessi however, he was in the office complex. I asked Mr. Stokes about the transformers. He said, "There are no transformers." I said "Great ! What I would like from you is a copy of the permits from the hazardous waste unit who transported the transformers from your facility to an approved disposal site." Mr. Stokes said, "I refuse to show you that information, I am not required by law to do so." I said, "Jerry, please think carefully, and consider your answer, and I repeated my request He said "I don't have to show that to you unless the EPA or Jerry Fawcett instructs me to". I terminated our meeting.

Mr. Pupka informed me, a private citizen may see this paper work due to the

Public Records Request Act. Kaiser Steel minimized the problem of this fire. By not showing me the records I have requested makes me think there is something they are hiding. If in fact they did deal with the tarnsformers properly, simply showing me the paper work, would have appeased me.

My husband has been working for the Return to Custody Facility, located at Eagle Mountain, for the last 16 months. He was a guard during the construction of the facility. He told me, when they were taking down the telephone poles, he saw about 25 transformers, that were removed from the poles. I know by law, Kaiser had 90 days to dispose of them, or have the hazardous waste team come out and remove the PCB's inside.

I am formally requesting you send me copies of the permits, proving Kaiser did in fact follow the hazardous waste disposal requirements. If there are no records of this, then where are the transformers ?

I thank you for your time and energy, and I will be awaiting your reply.

Respectfully,

Donna Charpied

Donna Charpied

MTC

MANAGEMENT & TRAINING CORPORATION
Eagle Mountain RTC Facility

INTEROFFICE MEMORANDUM

Memo To: FRANK BLAKE

Date: 7/11/89

Copies To:

From: JIM NELSON

MAINTENANCE

Jim Nelson

Subject:

ON THE AFTERNOON OF THURSDAY JULY 6 AT APPROXIMATELY 4:30 PM INMATE ____ _ __ CDC# RESPONDED TO THE URGENT AND IMMEDIATE NEED FOR TRAINED FIRE CONTROL PERSONEL. A FIRE HAD BROKEN OUT IN THE KAISER BENE PLANT WHEN A CUTTING TORCH IGNITED RUBBER LINERS AS THIS FIRE INVOLVED TRANSFORMERS FILLED WITH PCB. THE DANGER WAS INCREASED OVER AND ABOVE THE FIRE ALONE. THE EMERGENCY PASSED AT APPROXIMATELY 8:00 PM WHEN THE FIRE WAS EXTINGUISHED.

jn/mj

7/21/89 Another fire in same Kaiser Bldg. @ approx 6:47 A.M. Lake Tamarisk Fire + Rescue was called and they responded.

Kaiser Steel Resources

Post Office [illegible]
Desert Center, Calif
(619) 392-4[illegible]
(619) 392-4311 Telecopier

July 20, 1989

Mr. Joseph L. Asbury
Hazardous Materials Specialist
Environmental Health Division
Department of Health
3111 E. Tahquitz-McCallum Way
Palm Springs, CA. 92262

Dear Mr. Asbury:

As per our telephone conversation July 20, 1989, please find enclosed PCB compliance records.

1. Quarterly inspection of PCB equipment over 500 ppm.

2. Monthly inspections of the storage area - shipped out 02/10/88.

3. List of PCB equipment and level of contamination.

4. PCB spill at fines crusher & correspondence between Kaiser & Park Corporation. My letter dated 11/10/87 may explain the use of glue.

5. Shipment manifest.

6. PCB equipment shipped out 02/10/88, note that it also includes the transformer from the fines crusher spill. NOTE: These transformers were shipped to Clive, Utah also including 9 drums of solids. The oil & capacitors were shipped to Coffeeville, Kansas. Copies of these will follow.

7. The items placed in storage at present time for disposal.

8. Inspection of present storage area.

9. Transformer Nos. 2,3, and 6 were removed from the poles and the RTC facility, and placed in storage and then sampled.

Photos are also enclosed of the clean up of the PCB spill, as a result of the fire 07/06/89.

Sincerely yours,

Jerry W. Stokes

Jerry W. Stokes
Facility Manager

JWS/klv

Enclosures

KAISER STEEL

MEMO TO: G. A. Fawcett

DATE July 17, 1989

7

COPIES TO

FROM: J. W. Stokes

Jerry W. Stokes

AT: KEM

SUBJECT: PCB Compliance Update

The following items have been placed in storage for disposal - 23 barrels (content described below), and nine transformers:

BARRELS

#1. PCB oil pumped from SR# 64SJ602 Pinto well sub. (361 p.p.m.), placed in storage, January 1989.

#2. PCB oil pumped from SR# 64SJ602 Pinto well sub. (372 p.p.m.), placed in storage, January 1989.

#3. PCB oil pumped from SR# 6341375 Heavy media sub. (249 p.p.m.), placed in storage, January 1989.

#4. PCB oil pumped from SR# 6341375 Heavy media sub. (249 p.p.m.), placed in storage, January 1989.

#5. PCB oil pumped from SR# 64SJ601 Pinto well sub. (452 p.p.m.) and SR# 7372058 Bene blending sub. (-1 p.p.m.), placed in storage, January 1989.

#8. PCB oil pumped from SR# 6948743 Bene thickener sub. (513 p.p.m.), placed in storage, January 1989.

#9. PCB oil pumped from SR# 6948743 Bene thickener sub. (513 p.p.m.), placed in storage, January 1989.

#11. Contains (6) Six Westinghouse Interteen Capacitors, Removed from Met. Lab control room.
SR# 62K3223 62K3271 63E4456 62K3231
6261806 63E4456, placed in storage, February 1989.

#12-14. Park Corporation - contains contaminated soil from spill at fines crusher SR# E-694758, Placed

#15. PCB oil pumped from SR# 64SJ600 Pinto well sub. (361 p.p.m.), placed in storage, January 1989.

#16. (15 gal) PCB oil pumped from SR# 64SJ602 Pinto well sub. (372 p.p.m.), placed in storage, January 1989.

#17. PCB oil pumped from SR# 64SJ601 Pinto well sub. (452 p.p.m.), placed in storage, January 1989.

#18-23. Contains oil saturated soil from unused motor oil spill, placed in storage, January 1989.

TRANSFORMERS

1. Westinghouse SR# 1060342 167 K.V.A.
size - 36"W X 29" X 62"H
165 gal oil X 12.5 = 2,062.5 lbs. oil
2300 / 460 / 220 / 115 (16 p.p.m. / PCB)
Removed from service April 1989.

2. Westinghouse SR# 1061046 167 K.V.A.
size - 36"W X 29" X 62"H
165 gal oil X 12.5 = 2,062.5 lbs. oil
2300 / 460 / 220 / 115 (47 p.p.m. / PCB)
Removed from service April 1989.

3. Westinghouse SR# 1061047 167 K.V.A.
size - 36"W X 29" X 62"H
165 gal oil X 12.5 = 2,062.5 lbs. oil
2300 / 460 / 220 / 115 sample taken 05/24/89
Removed from service April 1989. 06/23/89 5.8 ppm PCB.

4. General Electric SR# B450387 50 K.V.A.
size - 21" X 46"
Total Wt. 970 lbs. Est. 45 gal oil
4160 / 7200y / 120 / 240 placed in storage & sampled 05/24/89
06/23/89 222 ppm PCB.

5. Allis Chalmers SR# 2537894 25 K.V.A.
size - 26"W X 35"H
16.5 gal oil = 206.25 lbs. oil
4160-7200y / 120 / 240 placed in storage & sampled 05/24/89.
06/23/89 25 ppm PCB.

6. Westinghouse SR# 60SF116 15 K.V.A.
size - 17" X 40"
Est. 25 gal oil
4160 / 480 / 115 placed in storage & sampled 05/24/89.
06/23/89 28 ppm PCB.

7. Westinghouse SR# 7025243 1000 K.V.A.
size - 78 X 68 X 71
261 gal oil X 12.5 = 3262.5 lbs. oil Pure 65%
Date tested - 06/11/86.

8. Westinghouse SR# 7025244 1000 K.V.A.
size - 78 X 68 X 71
261 gal oil X 12.5 = 3262.5 lbs. oil Pure 68%
Date tested - 06/11/86

9. Westinghouse SR# 7025245 1000 K.V.A.
size - 78 X 68 X 71
261 gal oil X 12.5 = 3262.5 lbs. oil Pure 60%
Date tested - 06/11/86

10. Contains 5 Capacitors
16 lbs. of dry soak.

11. Contains 4 Capacitors
16 lbs. of dry soak
Clean up materials

JWS/klv

KAISER STEEL

MEMO TO J. D. Saussaman

DATE September 20, 1978

COPIES TO J. T. Taylor
D. E. Wick
File

bcc - J. E. Good

FROM: J. O. Englund

AT Eagle Mountain

SUBJECT Consulting Services; Fluoride Removal
Eagle Mountain Domestic Water Supply

Reference:

The Eagle Mountain supply of potable water which comes from the Pinto Basin averages 2.4 - 2.6 parts per million in fluorine. Federal health standards which have been adopted by the state set a limit of 1.0 - 1.4 parts per million depending on the average ambient temperature.

In addition to the standards, California has recently put into effect, new regulations defining what is classified as a public water service. According to J. E. Good, Eagle Mountain would in all probability be defined as a public water supply inasmuch as at least five hook-ups are to the general public - i.e., the schools, cafe, stores, bank, etc. It is only a matter of time then before Eagle Mountain would have to either put in a defluorination plant or develop an alternative means.

The attached SER presented for your review covers the services of Mr. Frederick Rubel, Jr., a consulting engineer who specializes in defluorination plants. Mr. Rubel designed the Lake Tamarisk plant and several others around the country.

This SER would only cover one research visit, a water analysis and bench study to validate fluoride removal characteristics and a preliminary estimate of equipment necessary and operating cost projections.

The water from the Chuckwalla Basin runs on the order of 6-7 parts of fluorine per million and would require more extensive treatment to meet requirements.

Alternatives to building a treatment will depend upon the construction and operating cost of such a facility. One suggestion is to furnish bottle water to all homes.

Your approval is requested so that we might become prepared for any eventualities.

JOE:jj

KAISER STEEL

SPECIAL EXPENDITURE REQUEST

Requestor:	Department:	Date:
J. O. Englund	Raw Materials - EMM	September 8, 1978

Details & Purpose of Expenditure:

Consulting services for the removal of excess flouride from the domestic water supply at Eagle Mountain. Details in attached letter.

Estimated Costs & Duration (show costs in detail and total by months):

October	1978	$1,000.
November	1978	1,500.
TOTAL COST		$2,500.

For Use When Requesting Consulting Services:

Name & address of consultant

Frederick Rubel, Jr., P.E.
Rubel and Hager, Inc.
Consulting Engineers
4400 E. Broadway, Suite 710
Tucson, Arizona 85711

Expenses to be reimbursed & payment terms Payment to be made on monthly invoices.

APPROVALS: John C Englund 9/20/78
Department Head

Division Head

President or Vice President, Administration

Instructions:

1. Use this form to secure approval for special expenditures chargeable to administrative, selling and general expense categories. Examples are consulting services, sales meetings and special conferences, golf tournament, mine development and exploration projects, management training programs, etc.

2. Submit original to General Accounting and retain one copy. (General Accounting will make additional distributions as appropriate). When requesting consulting services, submit a copy to Purchasing (ref. Policy Statement 104.03).

3. General Accounting will initiate budget revisions upon receipt of this form properly prepared.

Rubel and Hager, Inc.

September 5, 1978

Mr. W. W. Miller, Purchasing Agent
Kaiser Steel Corporation
Eagle Mountain Iron Ore Mine
P. O. Box 158
Eagle Mountain, CA 92241

RE: Quotation No. 79-34600

Dear Mr. Miller:

Thank you for the opportunity to offer our consulting services for the removal of excess fluorides from your water supply. Enclosed for your files is a copy of the latest ALCOA NEWSLETTER which features our fluoride removal water treatment plants. We are working on other plants which are in various stages of design. I have spoken in detail with Mr. Dave Wick regarding the method in which we recommend your implementation of our services on this project. He requested that I confirm this to you in writing with a copy for him.

The first step is to perform a preliminary technical and economic feasibility evaluation for you. This effort includes the following:

1) One visit to the project site to obtain water samples for analysis and fluoride removal validation. Obtain data covering site information, soil analyses, well driller's log, historical data on water quality and consumption, climatological data and project design criteria.

2) Perform bench study to validate fluoride removal characteristic of water sample.

3) Perform chemical analysis of water sample.

4) Prepare report providing technical evaluation with preliminary installed equipment and operating cost projections.

This preliminary evaluation shall be completed within four (4) weeks of receipt of written authorization to proceed. Fee for these services shall be two thousand dollars ($2,000.00).

Consulting Engineers
4400 E. Broadway Suite 710
Tucson, Arizona 85711
Telephone 602 327-5515

RE: Quotation No. 79-34600

Upon completion of this study, you will have sufficient information from which you may plan and fund the operational plant. Services which we render for implementation of operational projects include the following:

1) Provide all reports, plans, and specifications required for approval of governmental authorities to construct a treatment plant for removal of excess fluoride from your water supply.

2) Assist in the preparation of proposal forms, notice to bidders and contract documents.

3) Assist in the evaluation of bids, negotiations and preparations of equipment and construction contracts.

4) Perform supervision of on site construction and installation as well as equipment manufacture.

5) Prepare operating and maintenance instruction manual.

6) Train plant operators.

7) Startup treatment operation.

8) Obtain approval of water supply for public usage by governmental authorities.

We furnish close surveillance of all phases of manufacture, installation operation, and maintenance to assure our clients of a quality finished project. Method of compensation for the desired scope of services is flexible and will be adapted to your normal mode of operation.

If you desire to visit our operating fluoride removal plants, please advise and arrangements will be made. We would appreciate the opportunity to serve you on your forthcoming project. We look forward to hearing from you in the very near future.

Very truly yours,

RUBEL AND HAGER, INC.

Frederick Rubel, Jr., P.E.

FR/jao
Enc.

KAISER STEEL

RECEIVED
DEC 10 1976
M. J. HUGHES

MEMO TO: M. J. Hughes

DATE: December 9, 1976

DE Wick

COPIES TO: J. O. Englund
L. J. Norby
J. F. VanDeBeuken

FROM: D. E. Wick

AT: Eagle Mountain Mine

SUBJECT: Inspection by Water Quality Control Board

Today Harry Hanson, Water Quality Control Engineer for the State of California, made an inspection of our facilities.

The tailing ponds were not leaking but the free water quantity in ponds No. 5 and 6 was excessive. A survey made of pond No. 5 on November 22 indicated in excess of 50 acre feet of free water. Only 15 acre feet is allowed by law. Today the return water pump was operating from No. 5 but off on No. 6 pond.

We will ignore this DEW

In a hand-written note given me by Harry Hanson was the name and address of the Chief Engineer in Sacramento, Department of Safety of Dams. He said we should send a copy of our proposed construction plans for pond No. 7 to this engineer. He said the note was not an order, but that eventually, we will get an order and will be inspected by the Dam Safety Engineer before pond No. 7 is approved.

Harry was pleased to see earthwork in progress by the railroad bridge to reinstall the drainage pipeline.

DEW/fn

VV-12

March 14, 1969

Mr. Arthur Swajian, Executive Officer
Regional Water Quality Control Board
P. O. Drawer 1
Indio, California

COPY

Dear Mr. Swajian:

In accordance with Resolution No. 67-2, we have the following information for the year 1968. In arriving at a water balance several corrections were made on the previous information that you had received.

Dry Tons Solids to Pond	Volume of Solids to Pond in Acre Feet	Acre Feet of Water to Pond	Acre Feet of Water Returned	Gain in Pond Volume in Acre Feet	Evaporation in Acre Feet	Net Unaccounted Acre Feet
1,371,757	315	2009	423	1120	349	432

Yours very truly,

KAISER STEEL CORPORATION

H. S. Scott

H. S. Scott
Chief Engineer

HSS/ve
cc: M. J. Hughes
H. M. Conger
J. E. Good

STATE OF CALIFORNIA RONALD REAGAN, Governor

COLORADO RIVER BASIN REGIONAL WATER QUALITY CONTROL BOARD

82-380 MILES AVENUE
P.O. DRAWER 1
INDIO 92201

March 20, 1969

Kaiser Steel Corporation
H.W. Conger, Assistant Manager
Eagle Mountain Iron Ore Mine
P.O. Box 158
Eagle Mountain, California

SUBJECT: Water Balance Report for Existing Tailings Basin for the year 1968.

We have made comparisons between the information contained in the subject report and the assumptions made in your engineering report for tailings basin No. 5. These comparisons indicate the following:

1. Infiltration
The net unaccounted for water for 1968 was 432 acre feet. The tailings basin had an average area of 38.4 acres. Therefore, the amount infiltrating into the strata below the basin could be as high as 11.3' per year. Your report prepared for tailings basin No. 5 estimates a maximum infiltration of 5.5' per year.

2. Water reused from pond
Your 1968 water balance reports that approximately 21 percent of the water discharged to the basin was reused. Your estimate for tailings basin No. 5 is 45 percent reuse.

3. Evaporation
Your estimate of the evaporation rate from the existing basin was 9.1 feet for 1968. The state climatologist reports this amount as measured from standard pans in the Coachella Valley-Salton Sea Area. A pan factor should be applied to this figure to convert to bodies of water. Therefore, it seems likely your pond's actual evaporation rate would be less than the 9.1' used in the water balance; and the infiltration would accordingly be even higher than reported.

Based upon the above, it would appear that several assumptions made in your engineering report for tailings basin No. 5 may not be realistic. The most important of these are:

1. Unless the amount of water reused can be increased to the estimated 45 percent, tailings basin No. 5 will be required to retain more water than indicated in your report.

2. If the infiltration from the new basin No. 5 is as high as that from the existing basin, then the waste water will infiltrate to ground water. Your consultant reported that laboratory tests indicate that the caliche underlying the basins would absorb 0.075 cubic feet of water for each cubic foot of caliche. Their estimate was that 5.5 feet of water would infiltrate each year, or a total of about 17 feet in three years. Based on these figures, they calculate 226' of caliche would absorb all the infiltration. Because over 300 feet of caliche exists between the bottom of the basins and the water table, it was their conclusions that the infiltration would not reach the water table.

   However, upon the basis of your 1968 water balance of 11.1 feet infiltrating, the wastewater would surely reach the water table.

In view of the above, we request that Kaiser Steel Corporation submit a supplement to their report of proposed waste discharge dated July 1, 1968 (prepared by Hawke Engineers). Said supplement should explain in further detail the facilities and procedures which will be used to limit the infiltration rate to not exceeding the 5.5 acre-feet of water-per-year per acre of pond area as set forth in said report. In addition, we desire information on your procedures for inspecting and testing the imperviousness of the lining being constructed in tailings basin No. 5.

COLORADO RIVER BASIN REGIONAL
WATER QUALITY CONTROL BOARD

Arthur Swajian

ARTHUR SWAJIAN, Executive Officer

WCP/jb

-11-12

March 31, 1969

Arthur Swajian
P. O. Drawer 1
Indio, California 92201

Dear Mr. Swajian:

COPY

I am writing you in answer to your letter of March 20, 1969.

In your letter you question several points which would directly affect the reliability of our program as accepted by the Water Quality Control Board in Resolution 68-19.

First, we have every confidence in our evaporation rate as we are now reporting it. In February of 1968 we installed a Class "A" type evaporation pan in accordance with U. S. Weather Bureau recommendations. We visited the U.S.G.S. station at the Salton Sea and observed their procedures in measuring and calculating evaporation rates. The evaporation rates that we have reported to your office have had a 0.7 factor applied to them. The only explanation I could offer you for our evaporation rate being higher than rates you are familiar with is that our tailings basins are located immediately adjacent to the Eagle Mountains and the water level of these ponds is elevated above the surrounding ground surface. As a result of these two factors, there is continual air movement across the surface of these ponds. In any event, these evaporation rates are reported to you as actually measured with the 0.7 factor applied.

Secondly, the methods we have had to use to determine the amounts of water and solids going into the basins leave a great deal to be desired. As I explained to you on the afternoon of August 2, 1968 when Mr. Jim Hawke and I visited your office, we had no accurate method of determining the amount of material that was being discharged from our plants and were having to estimate it. You may recall that we operate two separate plants, both of which generate slime tails. Since we only accurately weigh the saleable product coming from each of the plants, we have had no good handle on how much of the remaining material was coarse tails and how much was slime tails. After my meeting with you in August I realized that we must design and install a monitoring system for our slime tails that could provide us with reliable data with which to calculate our water balance. A sketch of this system is attached with a listing of the equipment purchased for installation. Similar systems will be placed in both plant slime tailing systems and will be operable before we activate the new #5 pond. These systems, with the required piping changes, will represent to Kaiser Steel an investment of over $30,000.00.

COPY

At the same time we were designing the monitoring system we undertook to improve the existing method of estimating the material going to the slime basin. A closer approximation of the amount of material discharge was achieved during the period of September through December by having personnel frequently take density samples of both slime systems and by constantly estimating the flow rates from the several points of discharge. The more frequent measurements showed that both the flow rate and densities changed frequently and that an accurage determination can only come from continuous measuring (which is what our new system will do). In any event, as you probably noticed, the water for which we could not account during the period of January through August, 1968, was at a 12.4 acre-foot annual rate and that during the period September through December, the annual rate was 8.4 acre-feet. The loss rate during this latter period by month was as follows:

September	4.9 Acre-feet (annual rate)
October	8.1 Acre-feet (annual rate)
November	14.4 Acre-feet (annual rate)
December	6.4 Acre-feet (annual rate)

It does not seem logical to me that the annual seepage rate for a given area could nearly double during a months time or be reduced by nearly 2 1/2 times in a month when the static head changed by only 2.5%. What this does show is that the actual amount of solids and water going into the basin is not yet being accurately reported and that until a reliable system of recording this material is installed, accurate measurement will be impossible.

In our judgement, nothing has transpired since August that would refute the facts that were presented to your office at that time. I have asked Mr. Hawke to submit to you under separate cover a statement reaffirming the conclusion of his earlier laboratory test work. I also asked him to enclose the results of his test work regarding the condition of the lining we are presently placing in the new #5 tailing basin in accordance with Resolution 68-19.

It may be of some interest that the lining that is now being placed in #5 pond to assure a minimum of seepage will cost Kaiser Steel Corporation in excess of $300,000.00.

We expect to complete the construction of #5 pond by May of this year and need to activate it at that time. Before we start discharging slime tailings into it we will ask Hawke Engineers to send you a report on the placement of the lining in the basin.

In closing, I feel that our determination of the evaporation rate for our tailing basin is correct and that while our estimate of the amount of material going into the basin deserves some criticism, we have taken positive and costly steps to more accurately determine this quantity. This will be reflected when we activate the #5 pond.

Very truly yours,

hc

H. M. Conger
Assistant Manager
Eagle Mountain Mine

HMC/ve
cc: M. J. Hughes
J. Hawke
J.O. Englund

ODL-981

April 8, 1968

D. E. Wick
Superintendent
Engineering Services
Eagle Mountain Mine

R. G. Moore
M. J. Hughes
E. M. Sanger
R. C. Forbes

J. O. Englund
Chief Metallurgist

Eagle Mountain

Permeability Testwork

The attached report covers the laboratory testwork done to date on permeability.

COPY

Kaiser Steel Corporation
Eagle Mountain Mine

Tailings Basin
Permeability Testwork

By: S. K. Khaderi
J. O. Englund

April 8, 1968

TAILING BASIN
PERMEABILITY TESTS

I OBJECT: The object of this test was to determine what, if any, percolation would occur of water from the slime tailings pond into the ground strata and to measure sulfate ion content.

II Introduction

The Colorado River Basin Regional Water Quality Control Board has recently begun to pay closer attention to Kaiser Steel Corporation and the disposition of slime tailings at the Eagle Mountain Mine. It is the contention of the Board that slime tailings water is excessively high in sulfate-ion and that seepage of this water into the ground strata is contaminating the sub-surface.

As part of a board resolution (67-2; superceded by 68-1) they require some test work to determine the extent of percolation - this test work to be conducted according to procedure established by a California State registered civil engineer. As a result of the original resolution 67-2 Mr. Phil Abrams, a consulting engineer with offices in Palm Springs and Beverly Hills, prepared an initial test program, a copy of which is attached.

III Summary

The permeability or percolation tests described by Mr. Abrams were conducted in the Eagle Mountain Mine Laboratory essentially as recommended.

A 10" diameter by 5' high percolation tube was set up in the laboratory for testing under both atmospheric pressure and a hydrostatic head of 48 psi which would simulate a 60' depth of tailings.

The results indicate that under atmospheric pressure and a 1' depth of slimes that percolation varied from an initial 17,054 to 4,185 gal/acre/day at the end of 19 days. Applying hydrostatic pressure to the same bed of slimes resulted in a sharp increase to 114,669 initially which tapered to 40,805 gal/acre/day after 8 days.

Increasing the depth of slimes to 2', and applying the 48 psi pressure resulted in a rate which varied from 53,689 gal/acre/day initially to 17,996 after 16 days.

A fourth test using a 4" diameter pipe with an increased height was set up, however, the results are questionable. This phase of the test will be repeated with a larger diameter pipe.

The sulfate-ion contents of the various filtrates were checked and found to be in a range corresponding to the usual assays - that is 2100 to 2700 ppm.

IV Procedure

A. Material Tested:

A composite sample of slime tailings from the North Wilfley pump to no. 4 tailings pond.

B. General Test Setup:

The experimental setup consisted of a 10" diameter x 5' high pipe to which was fitted the drain base plate of a standard 10" Denver Equipment Co. laboratory filter. This base is designed to collect filterate over the entire area of the pipe and discharge it through a 1" hole. A polyethylene filter cloth was placed over the base to prevent loss of solids.

A pressure cap with a pressure gauge and an inlet for water was fitted to the top of the pipe for pressure testing. A constant flow of tap water into the pipe maintained a hydrostatic pressure of 48 psi. In all cases the filtrate was collected in a flask and saved.

A similar set up was made for the 4" diameter x 16' high pipe with the exception of a pressure cap. No hydrostatic tests were made on this pipe. The outlet for filtrate consisted of a 4" hole in the bottom of the pipe. Again a polyethylene filter cloth was placed in the end of pipe to prevent the loss of sand and tailings.

Batch rinsing was done in a 10" standard Denver Equipment Co. laboratory filter.

C. Test No. 1.

Pipe dimension: 10" diameter by 5' high.

Sample height: 3.06" approximately.

Desert sand: 1' approximately.

Pressure: Atmospheric.

Approximately 1' of desert sand taken from the proposed tailings area was put into the bottom of the pipe. Over this, approximately 3.06' of fine tailings slurry were poured. The pipe was covered to keep evaporation to a minimum but vented to maintain atmospheric pressure.

Volume of filtrate was measured every 24 hours for 19 days. At the end of the test period the accumulated volume of filtrate was determined and a graph (Figure No. 1) was plotted, filtrate volume versus time.

D. Test No. 2.

Pipe dimension: 10" diameter x 5' high.

Sample height: 1' of compacted slimes from Test No. 1.

Desert sand: 1' approximately

Pressure: Hydrostatic 48 psi.

This test was conducted on the sample from Test No. 1, but under hydrostatic pressure of 48 psi to simulate a 60' depth of tailings.

Volume of filtrate was recorded every 24 hours for a period of 8 days. The volume of filtrate was measured periodically. Sulfate ion content of the filtrate was also determined. A graph (Figure No. 2) was plotted of filtrate volume versus time.

E. Test No. 3.

Pipe dimension: 18" diameter x 5' high.

Sample height: 2.88' of slurry over 1' of compacted slimes.

Desert sand: 1' approximately.

Pressure: Hydrostatic 48 psi.

The pipe was filled approximately 1 1/2' below the brim with the sample of slime tailings. Hydrostatic pressure of 48 psi was maintained for the test period. This step was adopted to determine the percolation rate with a greater depth of solids.

F. Test No. 4.

Pipe dimension: 4" diameter x 16' high.

Sample height: 14.83' (full) of slurry

Desert sand: 1'

Pressure: Atmospheric

The pipe was filled with slime tailings approximately 1/2" below the brim. Atmospheric pressure was maintained for the test. Volume of filtrate was recorded every 48 hours for a period of 35 days. A sulfate ion analysis was also made. Figure No. 5 shows a graph of filtrate volume against time.

G. Test No. 5.

Batch rinsing on a sample of slime tailings was done in a Denver laboratory filter.

Batches of 1 to 5000 cc of distilled water were filtered through the sample. The individual sulfate ion content in each filtrate was determined.

V Results and Discussion

Figure No. 1 to 4 show the percolation curves resulting from each of the tests. Although the actual rate of percolation varied with the test conditions the curves exhibit the same general shape - an initial high rate which breaks after 6 to 8 days and falls off to a lower rate. The break in all probability is due to compression of the slimes as they settle out.

The sulfate ion content of the filtrate in each case remained in the range normally experienced with the tailings water.

Test No. 1 (Figure No. 1)

The rate of percolation over the test period averaged 10,677 gallons/acre/day. Initially the rate was equivalent to 17,054 gallons/acre/day which fell to 4,185 gallons/acre/day by the 19th day. This was at atmospheric pressure and through a one foot bed of tailings.

Test No. 2 (Figure No. 2)

The initial rate was 114,669 gallons/acre/day which fell to 40,804 gallons/acre/day by the end of the 8th day. The overall average for the period was 51,633 gallons/acre/day.

During the test period the hydrostatic pressure was maintained as closely as possible to 48 psi which is the equivalent of 60' of tailings at 60' of depth and 60% solids.

Test No. 3 (Figure No. 3)

This test was similar to No. 2 with the exception that the bed of slurry was increased to approximately 2 feet to determine what effect, if any, the depth of bed would have on permeability. The initial rate was 33,689 gallons/acre/day which dropped to 17,996 gallons/acre/day after 16 days. The average was 28,550 gallons/acre/day for the test period. In

In comparing this test with test No. 2 there is a drop of 44.7% in average percolation rates.

<u>Test No. 4. (Figure No. 4)</u>

Test No. 4 was intended to show the effect of a greater depth of slimes on percolation under atmospheric conditions. For convenience a 4" pipe was used rather than a 10" diameter as in Test No. 1. In comparing the results to the latter there was an increase in the rate with greater depth. Possibly there is a wall effect from the smaller diameter pipe which would result in an apparent higher filtration rate.

<u>Test No. 5.</u>

Test No. 5 outlines the effect of batch rinsing a sample of slurry. Repeated rinsing will remove the sulfate ion. However, even when the sulfate in the filtrate was down to a minimum the remaining filter cake assayed 1.54% sulfur, indicating that not all the sulfur is soluble.

<u>VI Conclusions and Recommendations</u>

It may be concluded from the test work to-date that some percolation definitely does take place. The rate will be initially high when the pond is new and shallow. As material is added and compression sets in the rate falls off. Obviously percolation will cease at some time, however, from the foregoing test work it would be difficult to estimate when that point will be reached.

Experience tells us that this type of tailing has a tenacity for holding moisture and that years after any pond ceases to receive additional slurry the moisture in depth will remain at 30-40%.

Additional test work should be carried out to try and delineate a sharper more accurate time factor.

TABLE NO. 1.

Percolation Rates

Test No.	Test Period Days	Total Filtrate Gals.	Gallons/Acre/Day Initial	Gallons/Acre/Day Final	Gallons/Acre/Day Average
1	19	2.56	17,054 (11.8)	4,185 (2.9)	10,677 (7.4)
2	8	5.22	114,669 (79.6)	40,805 (28.3)	51,633 (35.6)
3	16	5.77	33,689 (23.4)	17,996 (12.5)	28,550 (19.8)
4	36	1.27	49,607 (34.4)	11,906 (8.3)	17,680 (12.2)

(   ) = gpm/acre/day

TABLE NO. 2

Test No.	Sulfate-Ion Content
1	2444
2	2756
3	2606
4	2162

TABLE NO. 3

Test No.	Distilled Wash Water-cc	Sulfate Ion
1	Original	2416
2	1000	1027
3	2000	362
4	3000	47
5	4000	15
6	5000	8

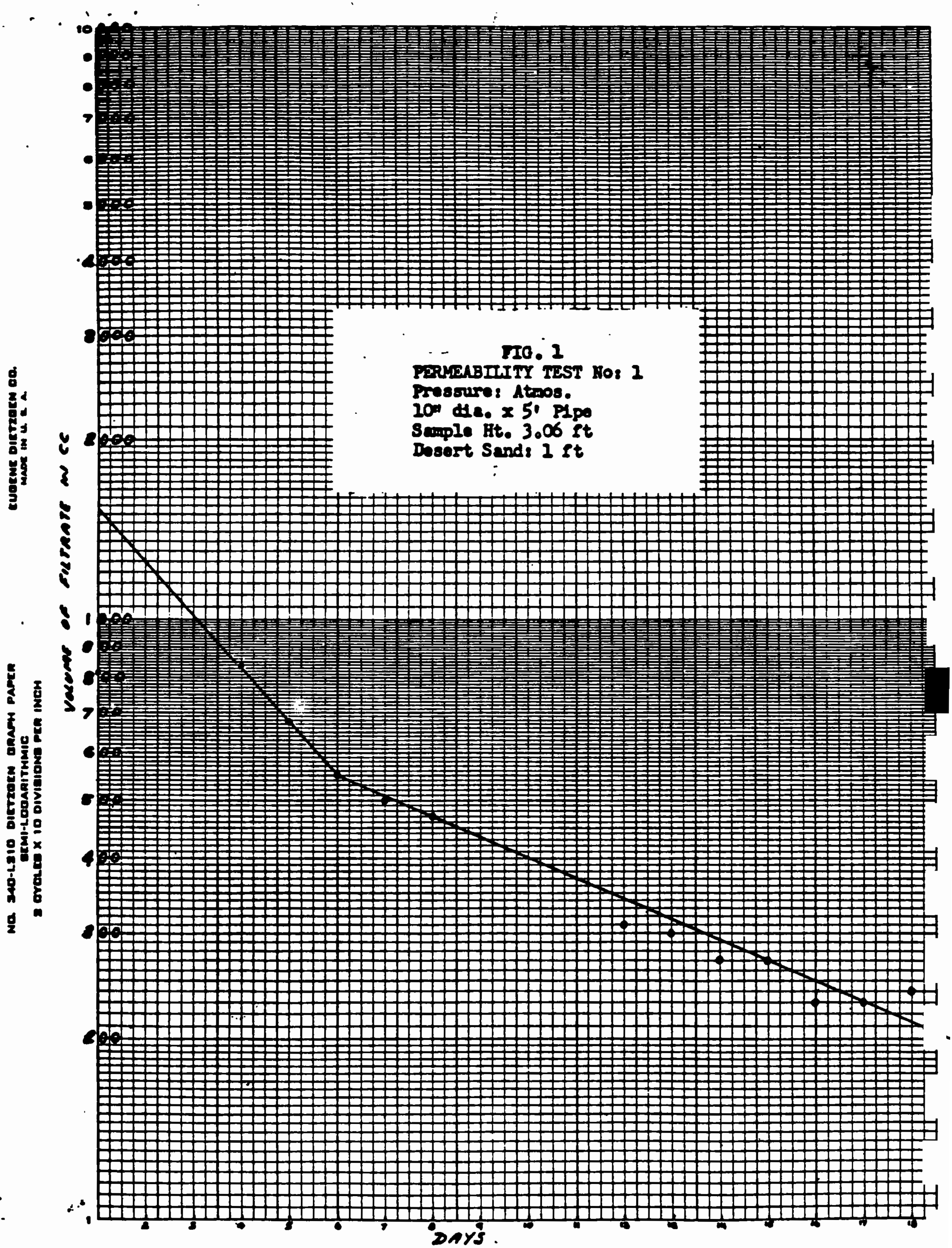
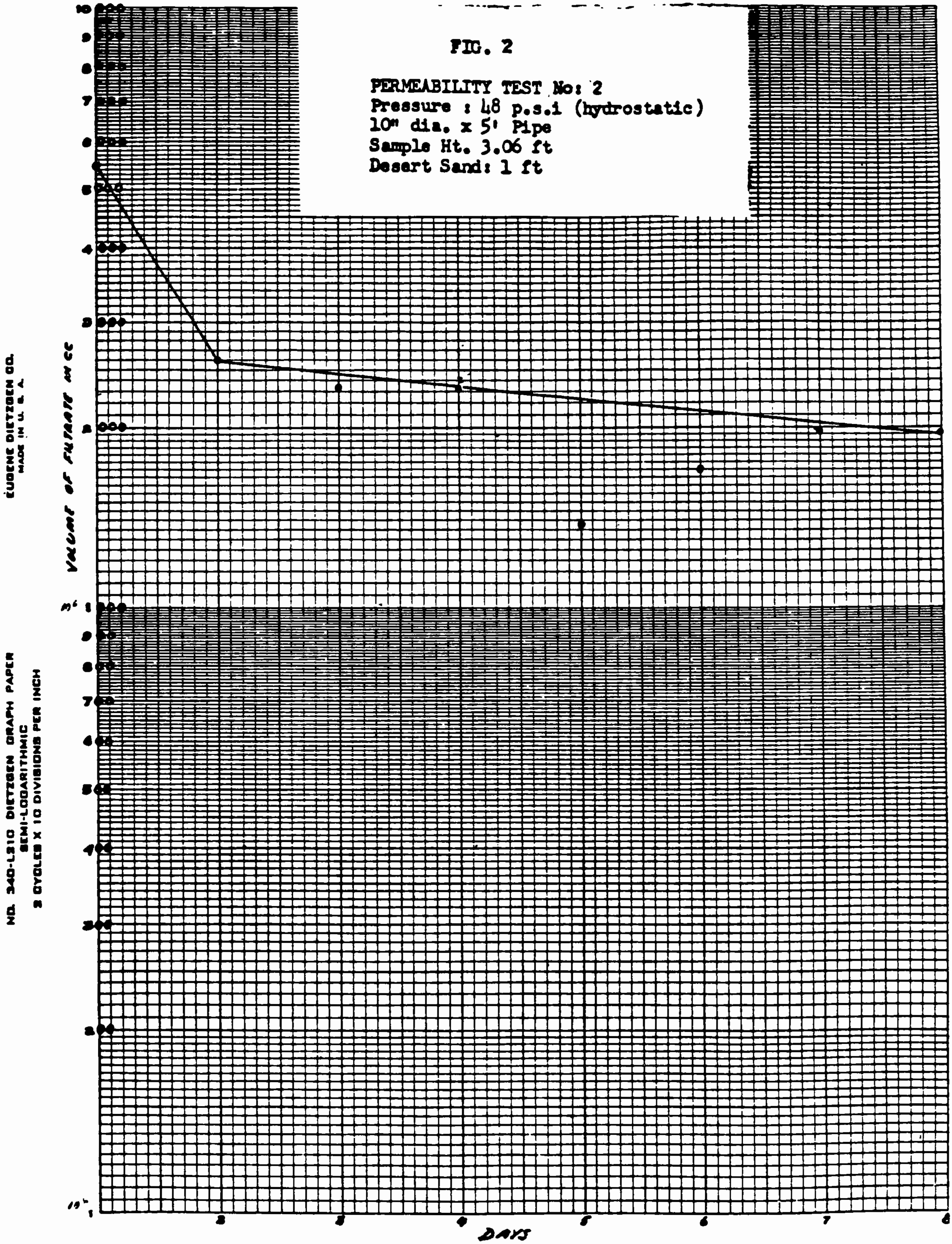


FIG. 1
PERMEABILITY TEST No: 1
Pressure: Atmos.
10" dia. x 5' Pipe
Sample Ht. 3.06 ft
Desert Sand: 1 ft

FIG. 2

PERMEABILITY TEST No: 2
Pressure : 48 p.s.i (hydrostatic)
10" dia. x 5' Pipe
Sample Ht. 3.06 ft
Desert Sand: 1 ft



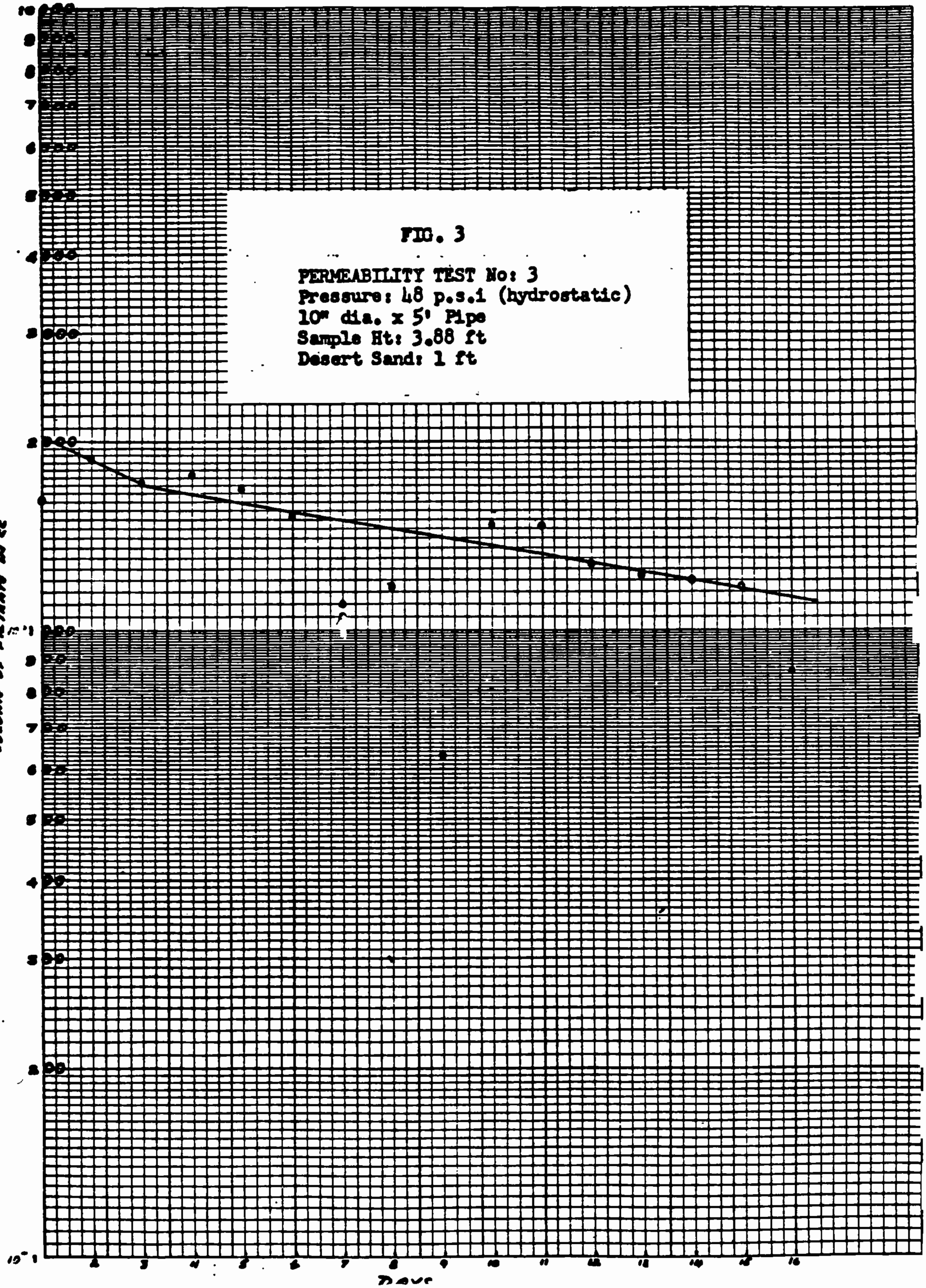


FIG. 3

PERMEABILITY TEST No: 3
Pressure: 48 p.s.i (hydrostatic)
10" dia. x 5' Pipe
Sample Ht: 3.88 ft
Desert Sand: 1 ft

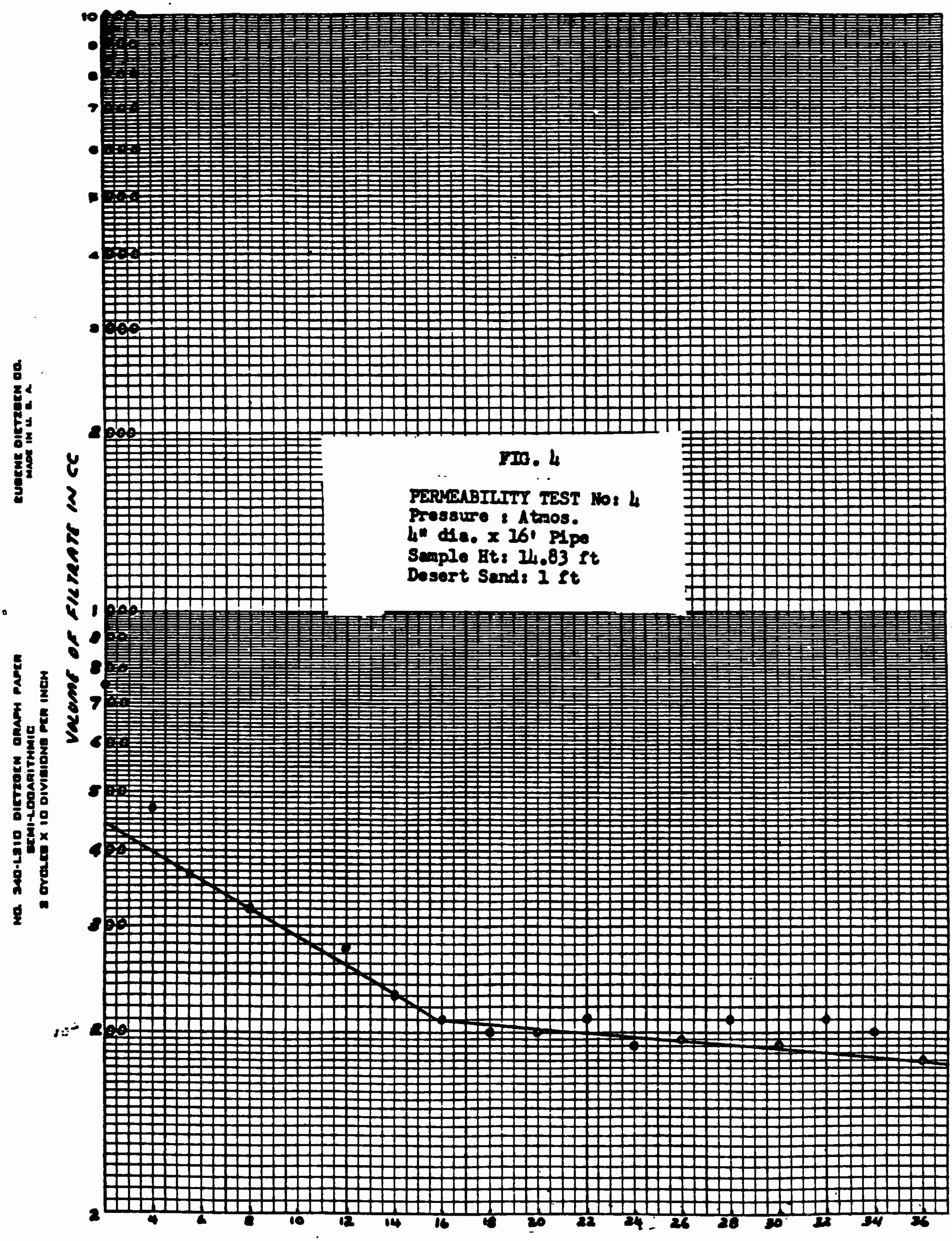


FIG. 4

PERMEABILITY TEST No: 4
Pressure : Atmos.
4" dia. x 16' Pipe
Sample Ht: 14.83 ft
Desert Sand: 1 ft

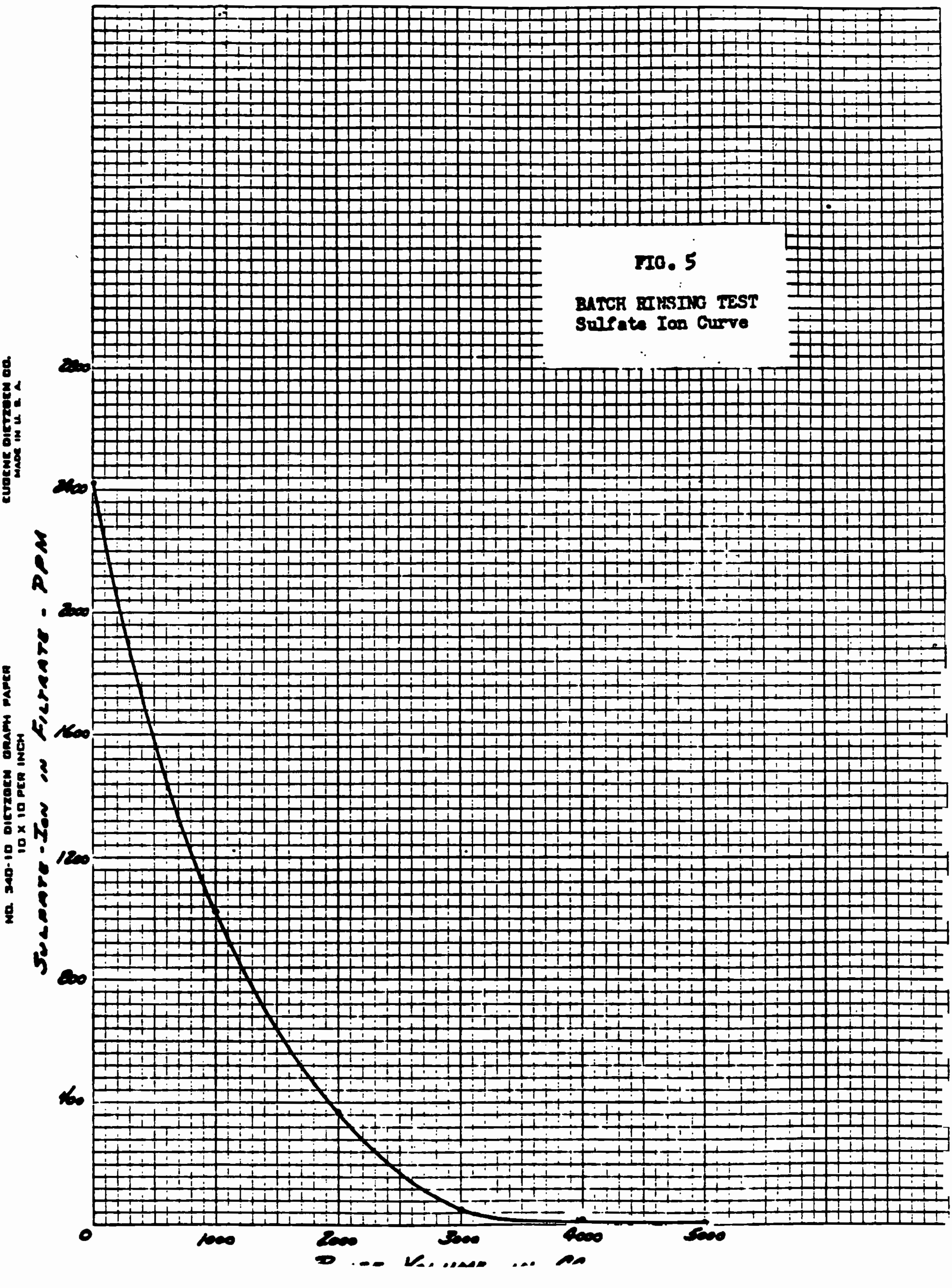


FIG. 5
BATCH RINSING TEST
Sulfate Ion Curve
Sulfate-Ion in Filtrate - PPM
2800
2400
2000
1600
1200
800
400
0
1000
2000
3000
4000
5000
EUGENE DIETZGEN CO.
MADE IN U. S. A.
NO. 340-10 DIETZGEN GRAPH PAPER
10 X 10 PER INCH

SEEPAGE
CONTROL, INC.

716 SOUTH SEVENTH STREET • P. O. BOX 4425 • PHOENIX, ARIZONA 85030, U S A • PHONE 254-4501

June 12, 1968

SCI #3832-A

Mr. Martin Hughes, Manager
Eagle Mountain Mine
Kaiser Steel Corporation
P. O. Box 158
Eagle Mountain, California

Subject: Seepage from Tailings Ponds

Dear Mr. Hughes:

Since my meeting with you and Harry Conger, I have given your problem considerable thought.

The basic problem is whether or not the groundwater is being or will be polluted or degraded by the alleged seepage from the ponds. The contamination would consist principally of calcium sulfate (gypsum), although it would probably be classed as a salinity problem as far as the pollution board is concerned. There is no question that the filtrate from the ponds is a potential degradent to the good groundwater below the mine if the filtrate reaches the water table. I say a potential degradent rather than pollutant in that the groundwater might not be unduly damaged by the filtrate if the dilution capacity of the groundwater aquifer is large.

Pollution control boards have taken the attitude that if a potential pollutant is being discharged from a plant, it is up to the plant to prove that such discharge will not harm the water resource involved. In the case of a flowing surface stream and a discharge from an outfall line, it is easy to prove lack of harm if stream standards have been established for the discharge point. In the case of seeping water or filtrate and an underground water aquifer, the discharge rate and dilution capacity is difficult if not impossible to determine. In addition, the time lag between discharge or seepage and detection of degradation of the groundwater is great, and is usually irreversible by the time degradation is detected. Because of this, pollution control boards have often denied requests to discharge potential pollutants on land where seepage could reach the groundwater.

Unfortunately, the decisions of these boards are rather wishy-washy and inconsistent, dependent upon the situation. The decisions of the board governing your area are not exceptions.

A material balance using the figures presented by Harry Conger and Dave Wick indicates that 754 acre feet of water is unaccounted for in your pond operation.

Three things must be evaluated in accounting for this discrepancy, namely measurement error, evaporation and seepage. Measurement of evaporation is rather nebulous, but I think the pollution board would accept a minimum evaporation rate of 7 feet per year, or 259 acre feet per year from the 37 acre pond. This leaves 495 acre feet for seepage and measurement error. If we assume no measurement error, 495 acre feet over 37 acres amounts to less than 0.04 cfd (cubic feet of water per square foot of wetted area per day), which is much lower than the average concrete lining used in canals and reservoirs.

In short, Mr. Hughes, you evidently have a very low seepage rate from your tailing ponds. To reduce this rate would be difficult and extremely expensive. I believe your problem lies in convincing the pollution board that minimal degradation of the groundwater exists.

This is an interdisciplinary matter that might require chemical, hydrological and engineering background. I have worked in the chemical end, but am not skilled in the hydrological end, and do not possess an engineering registration in California.

My background has been in water quality, seepage control investigations, and chemical-physical properties of clay type slurries (rheology, contamination, filtration characteristics, etc). This work has been on a research type basis rather than as engineering because of the limited general knowledge in the field. If I can be of service to you on a chemical and seepage basis, fine, but there is no way that I can offer engineering services in California. My charge for chemical seepage and pollution problem work is $150.00 per day plus necessary travel and out-of-pocket expenses.

I'm sorry that I can't be more specific, but there is such little data on your problem at the present that is precise enough to base conclusions on. Please advise if there is some way in which I can be of service to you.

Very truly yours,

J. Harlan Glenn

J. Harlan Glenn

JHG/zh

W-3

H. M. Conger
Assistant Manager
Eagle Mountain

M. J. Hughes ✓
K. B. Powell

July 12, 1968

H. S. Scott

H. S. Scott
Chief Engineer

Eagle Mountain Mine

Pinto Well No. 2 - Water Level

Pinto Well No. 2 was probed this day by H. S. Scott and J. G. Gill. The water level was at 917 feet elevation. The Engineering Department will continue to probe this well on a semi-annual basis, July and January.

HSS:gde

711-J Hughes

W-3

6-4

EXVPXV
ORE EN 7
2 FOR PX K B POWELL

SUBJECT: PINTO WELL NO. 2 WATER TABLE DATA.

RECORD OF PINTO NO. 2 WATER TABLE FALL IS FROM 1957 TO 1967 AND IS AS FOLLOWS:

GROUND ELEVATION AT WELL HEAD EQUALS [illegible] FEET.

YEAR	WATER TABLE ELEV.
1957	926 FEET
1958	926 FEET
1959	926 FEET
1960	925 FEET
1961	924 FEET
1962	922 FEET
1963	922 FEET
1964	922 FEET
1965	919 FEET
1966	918 FEET
1967	917 FEET

THE INFORMATION TAKEN FROM U.S.G.S. PUBLICATION, 'RECORDS OF WATER LEVEL AND PUMPAGE FOR 1967 IN JOSHUA TREE NATIONAL MONUMENT, CALIFORNIA'. THIS WAS PREPARED IN COOPERATION WITH THE NATIONAL PARK SERVICE.

H M CONGER
7-10-68 340P

KAISER STEEL

Kl-12

MEMO TO: M. J. Hughes
Manager
Eagle Mountain Mine

DATE: September 26, 1968

H M Conger

COPIES TO: J. E. Good

FROM: H. M. Conger
Assistant Manager

AT: Eagle Mountain Mine

SUBJECT: Results of the Meeting with the Colorado River Basin Regional Water Quality Control Board.

The Colorado River Basin Regional Water Quality Control Board held their quarterly meeting in Coachella at 10:00 A.M. this morning. The third item on their agenda was to consider the adoption of a resolution which set forth requirements under which Kaiser Steel Corporation could dispose of slime tailings at Eagle Mountain. Jim Hawke, soils consultant, John Englund and myself attended the meeting.

To recap, Kaiser Steel Corporation engaged Hawke Engineers, a consulting firm specializing in soil mechanics problems, to determine the least expensive way to insure that water from Eagle Mountain mill tailings will not pollute the ground waters of the Palen Hydro Subunit. Hawke Engineers were instructed by Kaiser to prepare a report, based on lab tests conducted in both Hawke's and Kaiser's laboratories, showing that the slime tailings being discharged were so impermiable that only a minimum of water could pass through the tailings and into the valley alluvium. The results of this work was that a 3 foot thick "blanket" of tailings at 25% moisture would control the seepage rate at not over 5.5 acre feet per year per acre, with a pond height of 80 feet. Laboratory tests further proved that the water which does pass through this blanket will be absorbed in the alluvium and will never reach the ground water system.

The Hawke Report was submitted to Kaiser Steel officials in mid-July and after study was accepted as a satisfactory alternate to having to line the bottom of the tailings basin with a plastic lining at from $0.05 to $0.07 per square foot. On July 31, 1968, 10 copies of the Hawke Report were sent to the Executive Officer of the Regional Board who in turn distributed them to the Board members and their staffs. Accompanying the reports was a letter from this writer to the Board requesting that, based on the conclusions and recommendations of the Hawke Report, Kaiser Steel Corporation be placed on the Board's September meeting agenda and at that time the Board would set requirements for construction of future tailings ponds at Eagle Mountain, and further, that these requirements be consistent with the findings of the Hawke Report.

KSC 46 R-4

On week prior to the Sept. 26 Regional Board meeting, Art Swajian, executive officer, sent Kaiser a copy of the draft resolution he had prepared for the Board's consideration. Close study of the draft disclosed nothing that would adversely affect Kaiser's operation at Eagle Mountain as the report was completely consistent with the Hawke Report.

At the meeting today, the Regional Board approved the tentative resolution as written and placed four restrictions on Kaiser Steel:

1. The 3 foot "blanket" would be constructed under the supervision of a registered civil engineer who is qualified in soil mechanics.

2. These requirements apply only to the construction and use of KSC #5 slime pond.

3. A water balance be submitted to the Regional Board monthly.

4. A water analysis of tailing water be submitted to the Board semi-annually.

These four restrictions will not cause Kaiser a problem. It is recommended that Hawke Engineers be retained to check the construction of the 3 foot "blanket" and certify in writing their findings to the Board. If you agree, Tom Mahon and Jim Good will proceed to ammend Hawke's contract to include this work. Kaiser Steel was already complying with parts 3 and 4 so these are no additional burden. It was gratifying to note that the Board did not require that the water balance be monitered by an outside party. This would have presented an awkward situation.

Unfortunately, the Board limited this resolution to #5 pond only. It was hoped that the resolution would have included all future ponds. However, by demonstrating that the #5 pond does not exceed the stated seepage, it is very likely that the Board will grant Kaiser Steel permission to build the large pond out in the center of the valley next.

During the month of November, enough of #5 pond will be excavated that construction of the 3 foot "blanket" can be started.

In the estimation of this writer, Hawke Engineers has performed a very valuable service to Kaiser Steel Corp. They have proven to the Regional Board's satisfaction that ponds properly constructed with Kaiser's own slime tailings hold seepage within acceptable limits without having to resort to a very expensive plastic lining and, equally important, assisted materially in getting the Regional Board off "dead center" in granting Kaiser permission to construct a new tailings pond.

W-12

ES No. 21

December 14, 1967

E. M. Conger
Assistant Manager
Eagle Mountain

M. J. Hughes ✓
J. E. Good
J. O. Englund

DEW

D. E. Wick
Superintendent
Engineering Services
Eagle Mountain

COPY

<u>Meeting with Water Quality Control Board</u>

When: December 14, 1967, 10:00 A.M.
Where: Coachella Valley County Water District Office
Coachella, California
Present: D. E. Wick, KSC Eagle Mountain
J. E. Good, KSC Fontana
Phil Abrams, Consultant for KSC, Palm Springs
Members of County Water District and State Department of Water Resources.

1. We were second on the agenda after a 1/2 hour discussion of waste discharge requirements of other communities.

2. Received a copy of a memorandum from the DWR dated Dec. 8 (attached) as to their remarks on our reports. Discussed this before the meeting with Phil Abrams.

3. Mr. A. Swajian explained the history and the program Kaiser has followed in reporting waste water flow as suggested by the Board. He made it clear that we have made a sincere effort, within our means, to obtain and report the quantities required. While they feel the reported evaporation rate is high they could not reject the report on that basis. As suggested by the DWR memorandum, Mr. Swajian thought we should make monthly estimates of our slime water flows and quarterly analyses of our pond water and submit these findings regularly. We agreed that this would be done. Therefore, without objection from anyone present, Resolution No. 67-2 was amended to provide for these monthly reports.

4. In reviewing the water flows, as shown on 67-2 as reported by KSC in November, 1966, we find them to be in gross error. The actual acre feet of water to the pond in 1965, for instance, is 1,115 and the return water must have been under 200 acre feet. Our total maximum annual water rate from the wells is presently about 7,000 acre feet.

The Resources Agency of California

COLORADO RIVER BASIN REGIONAL WATER QUALITY CONTROL BOARD
82-380 Miles Avenue, Indio, California 92201 (P.O.Drawer I)
Phone DI 7-1397

A G E N D A

Fourth Regular Meeting of 1967
To Be Held in the Board of Directors Chambers
Coachella Valley County Water District, Coachella

December 14, 1967 - 10:00 A.M.

1. Roll Call and Introduction of Guests

2. Minutes of the Regular Meeting of September 28, 1967

3. Waste Discharge Requirements

Resolution No.	Description
67-15	Senator Wash Reservoir - Imperial County
67-17	Southern Counties Gas Co. - Blythe
67-18	Chevron Chemical Co. - Thermal
67-19	Imperial Hot Mineral Spa - Sewage Disposal
67-20	Riverside County Dumpsite - Thermal
67-21	Riverside County Dumpsite - Mecca
67-22	Riverside County Dumpsite - Des. Hot Springs
67-23	Riverside County Dumpsite - Blythe
67-24	Imperial Hot Mineral Spa - Mineral Waters

4. Kaiser Steel Corporation - Industrial Wastes Disposal

5. Coordinated Areawide Sewerage System Plan for Palo Verde Valley Extended Area

6. Salton Sea Studies

7. Standards on Interstate Waters

8. Waste Treatment Facilities Need Study

9. Report on December 1, 1967 Meetings:
   a. State Water Resources Control Board
   b. Water Quality Advisory Committee

10. Other Business

11. Arrangements for next meeting

12. Adjournment

MEMORANDUM

TO: Colorado River Basin Regional Water Quality Control Board (No.7) Indio, Calif.

Attention: Mr. Arthur Swajian Executive Officer

Date: Dec. 8, 1967

Subject: Kaiser Steel Corp. Eagle Mountain Mine Industrial Waste Discharge

FROM: Department of Water Resources Los Angeles, California 90005

As you requested in your letter dated November 13, 1967, and the discussion of the subject disposal operation on November 28, 1967, we have reviewed the Kaiser Steel Corporation's report entitled, "Fine Tailings Disposal, Water Recovery and Loss Report for 6-Month Period; April 1 - September, 1967, Inclusive".

<u>Waste Water Inflow and Outflow at Pond</u>

To estimate the volume of percolation, the following information was provided by the Kaiser Steel Corporation:

Item	1965 a/	1967 b/
Inflow to Pond	8,350 AF/yr.	863.23 AF/6 mo.
Outflow from Pond	2,360 AF/yr.	111.92 AF/6 mo.
Storage within Pond	---	364.32 AF/6 mo.
Evaporation	---	339.53 AF/6 mo. c/
Percolation	---	47.44 AF/6 mo.

a/ Based on Kaiser Steel Corporation letter report on November 9,1966.
b/ Based on Kaiser Steel Corp. letter report dated November 20,1967.
c/ Estimated by Kaiser Steel Corp. at an equivalent of 19.4 feet/yr.

After reviewing and evaluating the information above and the reports from which it was drawn, the following major comments are presented:

1. There is a large difference in the volumes for 1965 and 1967, assuming the volume for the subsequent six months in 1967-68 will be the same as the reported six months in 1967.

(continued)

COPY

2. We believe that Kaiser's estimate of the rate of evaporation (19.4 feet/yr.) is excessively high; a reasonable rate would range from 6 to 7 feet per year. To obtain a reliable estimate of the evaporation rate, a standard method and equipment that have been field-tested by the Weather Bureau should have been employed for measuring evaporation and related information.

3. Based on a conservative evaporation rate of 7 feet per year and inflow-outflow estimates provided by Kaiser, the continued percolation of waste water from the pond is estimated to be about 530 acre-feet/yr.; this amount of water with high mineral concentrations is a threat to the beneficial uses of water of the Chuchawalla Valley. The timing and extent of probable damage would depend, among other factors, on (a) the quality and quantity of waste water percolating; (b) complex conditions of both the zones of aeration and saturation; and (c) relative location of groundwater pumped within the Valley.

4. The waste water percolating from the pond has a high concentration of minerals, which is conceivably a threat to the beneficial uses of the receiving groundwater; an indication of the composition of the waste water is presented in Resolution No. 67-2.

5. It is estimated there are over 40 million acre-feet of ground water in storage, although not all is usable and little is known in detail of its occurrence and water quality character. The approximation clearly indicates the presence of large ground water resources that should be protected for beneficial use.

Direct Subsurface Observations

In an effort to provide information on percolation -- or the lack of it -- Kaiser has drilled three holes. After reviewing and evaluating the information provided by Kaiser regarding these holes, our key comments are as follows:

1. The information presented does not provide reasonable evidence of the amount -- including the zero amount -- of percolation below the ponds, because of the extreme complexity of the factors requiring measurement, in order to obtain reliable, useful results.

2. Determination of where and how a fluid waste may travel from disposal site to the saturated zone requires detailed information on the physical characteristics and the location and extent of all pervious and impervious materials in the unsaturated zone.

3. In an unsaturated zone having variations in permeability and clay lenses, the inflow of water may be impeded by the lenses and perched water zones may occur; thus the water could spread laterally until it finds a way around the lens. In some cases, the impermeable layer may be dipping in a certain direction, and the lateral flow will be affected by the direction of the dip.

(continued)

4. The wells drilled to detect the extent of water percolation may not intercept or encounter any moisture, due to a possible condition in which impermeable layers dip away from the drill holes.

5. To obtain the required information, the locations and number of drill holes must be carefully selected and the drilling monitored. This must be followed by continuous observation and testing of the moisture content and flow with accurate instruments, such as the neutron probe. The observations may have to extend over a period of years because of the extremely slow movement of water. The entire operation which should be performed under the close supervision of specialists in this field, is both costly and time-consuming. Even under controlled conditions, the results may not provide conclusive evidence because of the complex nature of the phenomenon being observed.

Concluding Remarks

The attempt at direct subsurface observation has not provided evidence of percolation or the lack of it. An adequate program to obtain such evidence will be costly and time-consuming. We believe the expenditure of large amounts of money and time to obtain this evidence is not necessary to arrive at an estimate of percolation from the pond.

The evaluation of waste water inflow and outflow at the pond is a practicable method for estimating the amount of percolation from the pond for use in establishing waste discharge requirements.

In prescribing specific requirements for waste discharge, the Board should obtain from Kaiser the following information:

1. Monthly estimates on (a) inflow to the pond, (b) outflow from it, and (c) storage in it.

2. Quarterly reports on the chemical composition of the water discharging into the pond and the water in it.

By obtaining the above information, it will be possible to continue to reasonably evaluate both the quality and quantity aspect of this matter.

//signed//
James J. Doody
District Engineer
Southern District

W-2

IN REPLY REFER TO.
CAL-W80

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
Rm. 8024, 650 Capitol Mall
Sacramento, California, 95814

February 17, 1965

Mr. Martin J. Hughes, General Manager
Kaiser Steel Corporation
Eagle Mountain Mine
Eagle Mountain, California

Attention: Mr. Richard W. Brummett, Chief Engineer

Dear Mr. Hughes:

Thank you for the prompt reply to our letter of January 20, 1965, requesting records of monthly pumpage for 1964 from your wells in Pinto Basin.

Enclosed is a tabulation of pumpage by Kaiser Steel Corp. for 1960-64, a tabulation of the water level in well 3S/15E-4J1 (Kaiser well 2) for 1954-64, and a hydrograph showing the pumpage from Pinto Basin and the water-level change of Kaiser well 2 for 1958-64.

Sincerely yours,

For the district geologist

John S. Bader
J. S. Bader

Enclosures

Table .--Pumpage from wells in Pinto Basin by the Kaiser Steel Corp. for the calendar years 1960-65[1/]

[Metered in gallons by Kaiser Steel Corp., except as indicated]

	1960	1961	1962	1963	1964	1965
January	a47,438,000	40,642,000	a41,750,000	a94,895,000	90,566,000	
February	a47,438,000	38,990,000	a39,500,000	a91,789,000	93,578,000	
March	47,642,240	53,092,500	a54,650,000	a96,320,000	95,823,000	
April	49,393,760	a55,044,400	a55,540,000	a93,029,000	95,449,000	
May	50,635,000	a58,658,100	a59,790,000	a92,799,000	95,247,000	
June	54,746,300	60,845,000	a62,850,000	102,085,000	94,186,000	
July	44,657,200	67,979,500	89,318,000	110,127,000	94,964,000	
August	55,807,800	63,479,400	77,806,000	105,358,000	90,967,000	
September	51,653,516	a57,562,700	69,830,000	92,943,000	91,230,000	
October	42,101,084	a46,917,500	64,742,000	118,039,000	93,676,000	
November	38,538,600	a42,947,400	a66,400,000	93,121,000	105,748,000	
December	39,306,800	43,692,000	a67,280,000	99,776,000	93,892,000	
Total[2/] (gal)	569,000,000	630,000,000	749,000,000	1,190,000,000	1,140,000,000	
Total[3/] (ac-ft)	1,700	1,900	2,300	3,600	3,500	

1. For pumpage prior to 1960, see U.S. Geological Survey Water-Supply Paper 1475 O, "Hydrologic and Geologic Reconnaissance of Pinto Basin, Joshua Tree National Monument, Riverside County, California," by Fred Kunkel, 1963, p. 558.

2. Rounded to three significant figures.

3. Rounded to two significant figures.

a. Meter not in operation; quantity estimated by Kaiser Steel Corp.

Experimental Form
CAL 63-1

UNITED STATES GEOLOGICAL SURVEY - WATER RESOURCES DIVISION - GROUND WATER BRANCH

WATER LEVELS AND ARTESIAN PRESSURES IN OBSERVATION WELLS

CALIFORNIA COUNTY Riverside AREA OR BASIN Joshua Tree National Monument (7-6)

Well Number 3S/15E-4J1 S; Depth of Well 575 ft.; Altitude of Land-Surface Datum 1,080.6 feet above mean sea level.

Description of Well: National Park Service (Kaiser No. 2) At east end of Pinto Basin near Kaiser Steel Company's Eagle Mountain wells. Drilled well in alluvium, diameter 16 inches.

Records available 1954-; Highest water level ____ ft. ____, 19__; Lowest ____ ft. ____, 19__.

All water levels are referenced to land surface datum.

1961		1962		1963		1964		1965	
Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
Jan. 1.	156.14	Nov. 1.	158.79	Mar. 14.	159.28	MAR 19	159.49		
Mar. 28.	156.81			Oct. 31.	159.34	Nov. 25	159.58		
Nov. 9.	157.49								
Nov. 16.	157.77								

Well No 3S/15E-4J1 Continued

Experimental Form
CAL 63-1

UNITED STATES GEOLOGICAL SURVEY - WATER RESOURCES DIVISION - GROUND WATER BRANCH

WATER LEVELS AND ARTESIAN PRESSURES IN OBSERVATION WELLS

CALIFORNIA COUNTY Riverside AREA OR BASIN Joshua Tree National Monument (7-6)

Well Number 3S/15E-4J1 S; Depth of Well 575 ft.; Altitude of Land-Surface Datum 1,080.6 feet above mean sea level.

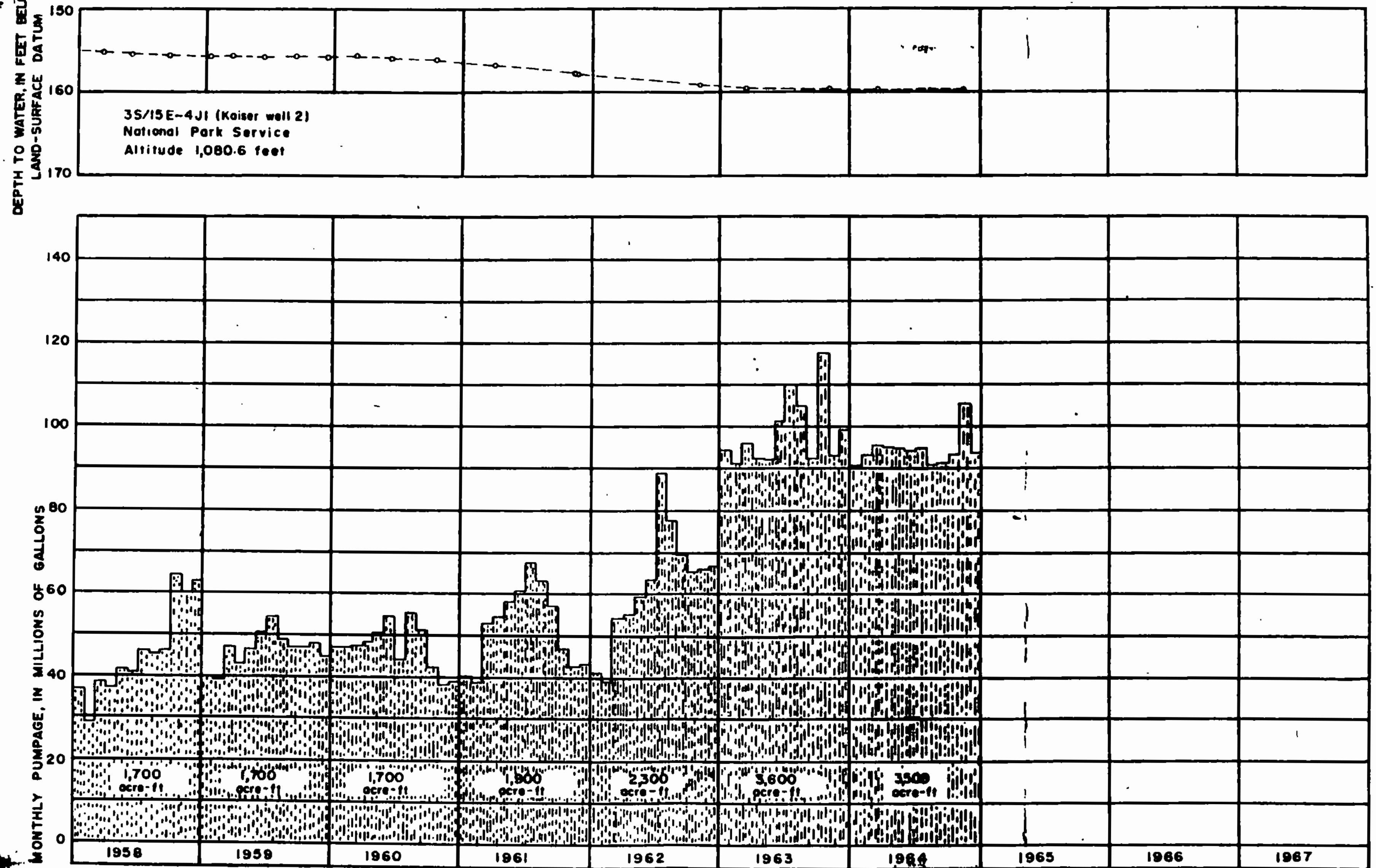
Description of Well: National Park Service (Kaiser No. 2). At east end of Pinto Basin near Kaiser Steel Company's Eagle Mountain wells. Drilled well in alluvium, diameter 16 inches.

Records available 1954- ; Highest water level ____ ft. ____, 19__; Lowest ____ ft. ____, 19__.

All water levels are referenced to land surface datum.

1954-1955		1956		1957-1958		1959		1960	
Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
1954		Feb. 9,	155.2	1957		Jan. 7,	155.7	Mar. 1,	155.6
Dec. 4,	e150			May 18,	155.21				
		Feb. 11,	155.1			Mar. 12,	155.6	June 12,	155.90
				May 19,	155.65				
		Feb. 12,	155.0			June 11,	155.8	Oct. 13,	155.93
1955				June 26,	155.48				
June 22,	154.94	Mar. 23,	155.0			Sept. 8,	155.71		
				Aug. 21,	e155.49				
Sept. 22,	155.20	May 27,	154.88			Dec. 10,	155.74		
				Sept. 18,	e155.37				
Dec. 22,	155.6	July 27,	e155.3						
				Nov. 30,	155.0				
		Aug. 18,	155.3						
		Sept. 19,	155.7						
				1958					
				Mar. 2,	155.1				
				May 30,	155.4				
				Sept. 15,	155.6				

Well No. 3S/15E-4



HYDROGRAPH OF WELL AND PUMPAGE IN THE EASTERN PART OF PINTO BASIN

W-2

R. G. Heers
Manager
Mining and Raw Materials

M. J. Hughes

June 22, 1964

K B Powell

K. B. Powell
Superintendent
Mining and Raw Materials
Fontana

Eagle Mountain New Wells
Water Analyses

Attached herewith is a copy of a report and analyses of the water in the two new wells which are being developed.

You will note the higher than allowable fluoride content. This is not good, however the water as planned now will all go into the existing industrial reservoir near the tailings ponds and, therefore, should never get into the system serving the housing area or the drinking water lines in the plant area.

It should also be noted that the samples stood for a period prior to running the tests. In fact, one sample arrived in a container without a cap. When wells are started and lines well flushed, adequate samples, correctly taken, will be handled to get a more correct analysis. These results should be considered preliminary until that time.

KBP:mat
attachment

KAISER STEEL CORPORATION
Inter-Office Memorandum

To· Ken Powell
Superintendent
Raw Materials

Date: June 18, 1964

From: W A Richardson
W. A. Richardson
Chief Chemist

By: K. R. Fitch
Research Chemist

Subject: Well Waters - Eagle Mountain Area
Wells No. 1, Section 2 and No. 1, Section 11

Situation These wells are located five miles south of Pinto Wells. Is the water suitable for drinking?

Note These water samples had stood around in the plastic bottles for about three weeks before reaching the laboratory.

Conclusions

1. The waters do not meet U. S. Public Health Service Drinking Water Standards.

2. They were not too bad and could be made suitable for drinking by proper dilution (or treatment).

Discussion The fluoride content of the waters involves an immediate difficulty for drinking purposes. The U. S. Standards give a limit, not to be exceeded, of 0.7 to 1.2 ppm (mg per liter) and as a cause for rejection, 1.4 to 2.4 ppm. The limits vary depending on the temperatures involved (lower concentrations at higher temperatures). They are predicated on the mottling effect on teeth rather than for strictly toxicological reasons. Our present mine waters run 2 to 2.5 ppm which is about the limit. The well waters would have to be mixed to bring the fluoride content down to safe maximum levels.

The total solids run well above the usual 500 ppm maximum. However, suitability for drinking depends much on their contents. Here the sulfate fluctuated around the 250 ppm maximum but the chloride amounted to only about half of its 250 ppm limit. Manganese however ranged up to three times the acceptable level of 0.05 ppm and the dilution necessary to bring this down would amount to about the same as for fluoride. Borate and strontium were both present at low levels and copper was far below its limit. No barium showed up spectroscopically.

Waters generally contain some oil and grease from pumps, etc. A direct extraction by normal pentane recovered the oil and the organic part of the grease after subsequent acidification by HCl. This left some water soluble organics to be recovered by evaporation to dryness and taking up with tertiary butyl alcohol, etc. Any containers which previously held detergent and soap solutions, etc., could prossible furnish some

Discussion Continued.

to the water sample. But waters passing through the soil always pick up some organic matter which does not involve human pollution. Phosphates are sometimes recognized as products of human or animal metabolism and the very low contents here point away from any such contamination. Waters passing through soils often contain bacteria of non pathogenic types. No such tests were run.

The nitrate contents had of course changed in the time the water had stood around in the plastic bottles. Organic matter tends to combine with nitrates and dissolved oxygen causing their removal especially when the water is removed from the ground and warms up. So the figures have come down from the originals by an unknown amount. The quantities probably ran over 30 ppm but as an educated guess we do not think they reached the U. S. Standard limit of 45.

Analysis Attached.

KRP/ml

Well Waters - Eagle Mountain Area
Wells No. 1, Section 2 and No. 1, Section 11

Analysis (Spectroscopic and Wet)

	No. 1 Section 2	No. 1 Section 11
pH	8.00	8.02
Suspended Solids	24 ppm	36 ppm
Dissolved Solids	775 "	773 "
Total Solids	799 "	809 "
CO_3	0 "	0 "
HCO_3	105 "	183 "
Total Alkalinity	105 "	183 "
Cl^-	128 "	125 "
$SO_4^{=}$	283 "	200 "
$PO_4^{\equiv}$	.03 "	.035 "
F^-	6.0 "	5.5 "
NO_3^-	11 "	28 "
SiO_2	13.5 "	18.7 "
Al_2O_3	2.6 "	4.5 "
MgO	3.7 "	3.7 "
B_2O_3	1.0 "	.9 "
TiO_2	.4 "	.4 "
Ca^{++}	33.0 "	21.0 "
Sr^{++}	1.5 "	.8 "
Na^+	220 "	262 "
K^+	2.1 "	2.6 "
NH_4^+	1.4 "	1.8 "
Cu	.05 "	.05 "
Mn	.15 "	.08 "
Oil	6.0 "	1.5 "
"Grease"	3.0 "	3.0 "
Water Soluble Organics	6.0 "	6.0 "

W

KAISER STEEL CORPORATION
SUPPLEMENTARY
WATER RESERVE REPORT
CHUCKWALLA VALLEY - PINTO BASIN
RIVERSIDE COUNTY, CALIFORNIA

Arthur F. Peterson January, 1964

Submitted at Riverside Co. Admin. Center
Scoping meeting

KAISER STEEL CORPORATION

SUPPLEMENTARY WATER RESERVE REPORT

CHUCKWALLA VALLEY - PINTO BASIN
RIVERSIDE COUNTY, CALIFORNIA

By Arthur F. Peterson

INTRODUCTION

This report is submitted as a supplement to, and is to be considered a part of, the original study completed by the writer in January, 1960. The geological maps and cross-sections, well data, ground water flow patterns and other material presented therein are to be used in conjunction with this report.

The pertinent geologic features of the area are quite well known and stratigraphy, sedimentation patterns and aquifer delineation has been defined. However, more information has been made available to substantiate and more clearly define the zonal characteristics of the unconsolidated valley fill through the additional drilling of water wells since 1960. This applies only to the central area (Airport) of the Chuckwalla Valley. To the writer's knowledge no additional wells have been drilled in the Pinto Basin Area since the completion of the Kaiser Steel Corporation Well No. 3 in 1957.

Several hydrologic and reconnaissance geologic studies of the subject areas have been made in recent years by the United States Geological Survey and the California Department of Water Resources on a Federal - State cooperative ground water investiagion basis. These reports are available (see references) and were reviewed for critical analysis. The writer furnished a considerable portion of the data contained in the most recent publication - - - "Data on

Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California", by F. W. Giessner. Other selected references were used and may be noted in the Appendix of this report.

The Pinto Basin and Chuckwalla Valley Areas have been defined in previous reports and their configuration noted. Areal distribution of the consolidated and non-consolidated rocks have been established, although the geologic age of some of the younger sediments, including the more recent valley fill, has not been clearly determined.

Added geological and hydrological information used in this study was also obtained from the examination of driller's logs, electric logs, and well-pumping tests, including fluid levels and discharge rates, from the more recent wells drilled in the central Chuckwalla Valley Area. This information is considered confidential and will be released only through written consent of the Kaiser Steel Corporation and the author.

A large reservoir of ground water occurs in the saturated earth materials beneath the land surface in Pinto Basin and Chuckwalla Valley. Variations in the lithologic character, distribution, and structure of the earth materials controls the occurrence, source, movement, and availability of the ground water. This pertinent data has been presented in the previous study.

The aquifers are distinct lithologic units or combinations of such units that have an appreciably greater transmissibility of fluids than adjacent units (silts and clays). These aquifers store and transmit water that is more readily recoverable in usable quantities.

The aquifers consist mainly of sand, gravel, cobble conglomerates and mixtures thereof. Porosities and permeabilities are considered rather high because most of the valley fill materials have been derived from surrounding quartzitic mountain masses. It is also recognized that some of the less stable material is derived from basalts, phyllites, and schists, which for the greater part, is the source material for the clays and silts found in the unconsolidated rocks comprising the valley fill. The genetic sequence of beds indicates an average of at least 65 percent permeable sand count in most areas, although electric logs on several wells have indicated a sand count as high as 85 percent.

Three distinct geohydrological units have been identified (see Geological Cross-section B-B'). These units have been named the Upper, Middle and Lower Zones and are considered to be more or less distinct hydraulic systems. Deeper drilling in the central portions of both basins will undoubtedly extend the stratigraphic sequence of the basal unit as this area has not been completely penetrated to basement rocks.

Present water demand by the Kaiser Steel Corporation at its Eagle Mountain Mining complex is approximately 2000 gallons per minute, or 9 acre feet per day. It is estimated that this demand will increase at least 60 percent with the contemplated addition of several new facilities. This report, therefore, will consider a 100 percent increase to insure the availability and adequacy of the water supply.

WATER RESERVES

PINTO BASIN AREA

96

PINTO BASIN

The two existing active water wells used by the Kaiser Steel Corporation are located in the extreme southeastern end of the Pinto Basin, which in turn is near the sedimentary and topographic confluence of the Pinto Basin and the Upper Chuckwalla Valley. Neither of these wells were drilled to the basement complex, thus, aquifer exposure is not complete. Well No. 1 was originally drilled and used as a source of water by the Metropolitan Water District in 1933. It was later acquired by Kaiser Steel Corporation. This well was drilled to a depth of only 547 feet. The present condition of the well can be classed as only fair, inasmuch as it was a cable tool well which has been knife perforated with no gravel enevelope to act as a filtering screen. The well has been cleaned several times and excessive amounts of sand have been found in the lower portion, tending to isolate production from the bottom 80 to 100 feet. Hence, the efficiency and productive capacity of this well could be increased if a pre-perforated liner could be inserted to alleviate the sanding condition. It is recommended that this procedure be adopted the next time the pump bowls are withdrawn from the well.

Well No. 2 was drilled by Kaiser Steel Corporation in 1957 to a total depth of 675 feet and is considered to be adequate for the present. It is a gravel envelope well.

To the writer's knowledge these two installations are the only wells in the Pinto Basin that are presently withdrawing any relatively great amounts of water from this storage area. Present production from these two wells can be sustained for at least 15 years if mechanical and corrosive factors are not considered.

However, if this source is to be maintained either as a constant or a standby source then it is recommended that at least one additional well be drilled in this basin within the next five years. Any new well installation in this area should penetrate the complete stratigraphic section and expose all saturated aquifers to production. This is to insure higher rates of productivity and lesser draw down factors. The new well should be drilled at least one-half mile north and east of the present wells. This will insure adequate drainage and reduce the area extent of the hydraulic "cone of depression". This inverted hydraulic "cone", surrounding any given well or well field, is primarily the curved hydraulic surface expressed horizontally between that static and pumping levels in a well exposed to perforated production. (See Illustration - Appendix.)

The total average thickness of the saturated aquifers in the Pinto Basin has been conservatively estimated at 300 feet. This is the permeable sand count and does not include silt or clay facies. The ground water storage unit in Pinto Basin comprises some 40 square miles. This acreage allotment does not include several small areas that may contribute fluids to the storage basin. No recharge factors are being considered in the estimate of fluid reserves. Thus, the 40 square mile area equals 25,600 acres of storage capacity. Observed porosities obtained from similar sedimentary rocks in Chuckwalla Valley average 28 percent. Permeability and transmissibility factors are considered quite high, in some instances to the several Darcy level. If a maximum efficient ratio between fluid withdrawal and reservoir energy is maintained then at least 70 percent the fluids in storage may be withdrawn from the total porous volumetric mass. Some 30 percent will be retained by surface tension and depleted aquifer delivery components.

Present usage and demand is approximately 2000 gallons per minute, or roughly 9 acre feet per day.

9 acre feet per day = 3,285 Acre Feet Per Year

ESTIMATED TOTAL WATER RESERVES IN PINTO BASIN -

805,280 Acre Feet of Water.

Theoretically, this would indicate enough water to serve the present demand of 3,285 acre feet per year for approximately 2-1/2 centuries. This, of course, would imply the complete dewatering of the Pinto Basin storage area. However, this is not a practical approach because the two existing wells could never drain the complete basin. As previously stated, additional wells would have to be drilled to dewater all the aquifers. Also, it is estimated that at least 20 percent of the water from the Pinto Basin will eventually find its way into the Upper Chuckwalla Valley due to the ground water underflow between these two basins. (See Ground Water Flow Patterns - 1960 Report). Thus, the recoverable available fluids from the Pinto Basin storage area is reduced to roughly 650,000 acre feet.

PINTO BASIN

TOTAL WATER AVAILABLE = 650,000 Acre Feet

and

Double present production to 4000 g/m

or, Approximately 6,570 acre feet per year, then

Water in storage = 90 years production.

WATER RESERVES

CHUCKWALLA VALLEY AREA

CHUCKWALLA VALLEY AREA

Reference is made to the "Preliminary Hydrological & Stratigraphic Report" submitted by the writer to Kaiser Steel Corporation in January, 1960. The present study is to be considered as an up-dating and supplementary report thereto. Considerable more well data and stratigraphic information has been obtained from the drilling and completion of several new water wells, especially in the "Airport - Desert Center Area". The new well data, including several electric log surveys, has confirmed and supported the zonal correlations offered in the January, 1960 report.

The regional distribution of the aquifers in these zones have been more clearly defined and in some instance the permeable sand facies of these aquifers have been increased due to greater penetration of the valley sediments. This, of course, will substantiate the additional water reserves presented herein. It may also be added that no well, to date, has penetrated the complete geological section in or near the central portion of the Chuckwalla storage basin. The estimated thickness of the complete stratigraphic section of unconsolidated valley fill may range as high as 1200 feet plus in the deepest confines of the basin. Hence, it becomes quite obvious that fluid reserves could be greater than herein estimated.

Specific capacities of some of the more recent wells are rated as high as 4000 to 5000 gallons per minute, with a specific yield of some 90 to 100 gallons per minute per foot of draw down. These yields were obtained from wells less than 650 feet in depth; however, the permeable sand development was quite extensive with the overall sand count ranging upward to 85 percent. The foregoing indicates substantial transmissibility components capable of delivering large

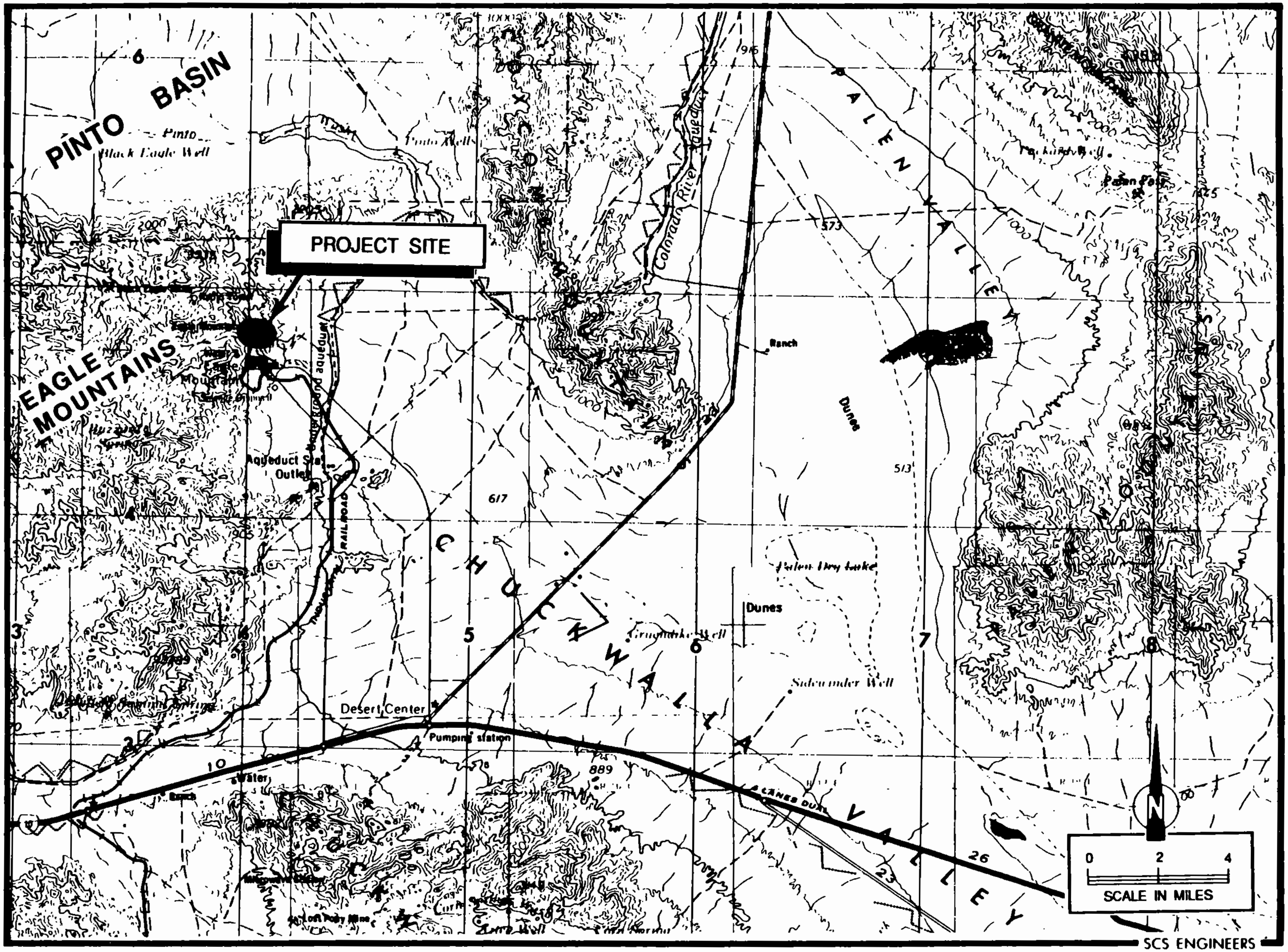


Figure 2. Northwestern Chuckwalla Valley.

TABLE 2
PINTO BASIN WATER QUALITY DATA

Well	KS Pinto 1	Park Serv. 2	KS Pinto 1,9	KS Pinto 1,9
Well #	3S/15E-4K1	3S/15E-4J	3S/15E-4K1+ 3S/15E-4K2	3S/15E-4K1+ 3S/15E-4K2
Date	2/11/56	12/5/54	11/30/57	1/6/83
pH	8.2	8.1	7.7	8.3
Electrical conductance	1,010		1,020	990
TDS	618	571	598	610
Calcium	10	14	11	16
Magnesium	0.7	0.7	2	0
Sodium	280	199	200	196
Potassium	3.2		3.5	5
Iron		0		0.03
Bicarbonate	118	77	102	85
Carbonate	0	8	0	0
Sulfate	216	245	216	234
Chloride	102	97	104	82
Nitrate	18		22	15
Fluoride	2		2.5	
Hardness	28	38	36	

NOTE: Analyses in mg/l (parts per million) except for electrical conductance (micromhos) and pH.

within township (3S), range (15E), section (4), and the sixteenth or 1/4-1/4 division of the section (designated 1/4-1/4 section K). This system is consistent with the well numbering system used by the State of California.

Water quality data from the Pinto Basin wells is summarized in Table 2; in general, this water can be characterized as having total dissolved solids (TDS) content averaging about 600 mg/l, and relatively high levels of sodium and sulfate. Sodium, bicarbonate, chloride, sulfate, and fluoride average about 200, 90, 100, 240, and 2 mg/l, respectively.

<u>Chuckwalla Basin</u>--The Chuckwalla Valley basin is an 870-square-mile basin with internal drainage. It consists of a broad, alluviated valley bounded on the south by the Orocopia, Chuckwalla, Little Chuckwalla, and Mule Mountains. It is bounded on the west by the Eagle Mountains, and on the east by the Mule and McCoy Mountains. Several northerly-trending mountain ranges (the Coxcomb, Granite, Palen, and Little Maria Mountains) bound the valley to the north, and extend southwards to partially divide the valley; the intervening valleys are contiguous with and tributary to the main part of Chuckwalla Valley (Giessner, 1963).

There are no perennial streams or any permanent natural bodies of water in the Chuckwalla Valley. During heavy rains, some precipitation runoff may flow to sinks at Palen and Ford Dry Lakes; standing water may occur at these lakes for a short time after heavy rains.

Subsurface flow into the Chuckwalla Valley is from three sources: the Pinto Valley to the northwest; the Hayfield basin to the west; and the Cadiz Valley to the north. Mann (1986) estimates inflows of 2,500 acre-feet of water per year from the Pinto basin; 1,700 acre-feet per year from the Hayfield basin; and an unknown amount from the Cadiz Valley. Ground water in the northwestern Chuckwalla Valley is replenished by ground water inflow from the Pinto basin, and by runoff from the slopes of the mountains surrounding the valley (Figure 2).

Except perhaps during very heavy storms, most of the rain falling directly on the valley floor is probably lost to evapotranspiration, and does not add

TABLE 1
SUMMARY OF HYDROGEOLOGICAL DATA ON LOCAL GROUNDWATER BASINS

Area of Basin (sq. mi.)	Depth to Groundwater (feet)	General Direction of Flow	Inflow to Basin	Underflow Out of Basin	Storage Capacity (acre-feet)
		PINTO VALLEY BASIN			
310	20-450	East	Precipitation	Chuckwalla Valley	230,000
		CHUCKWALLA VALLEY BASIN			
870	20-600	Southeast	Precipitation, Pinto Valley, Cadiz Valley, Orocopia Valley	Palo Verde Mesa	9,100,000

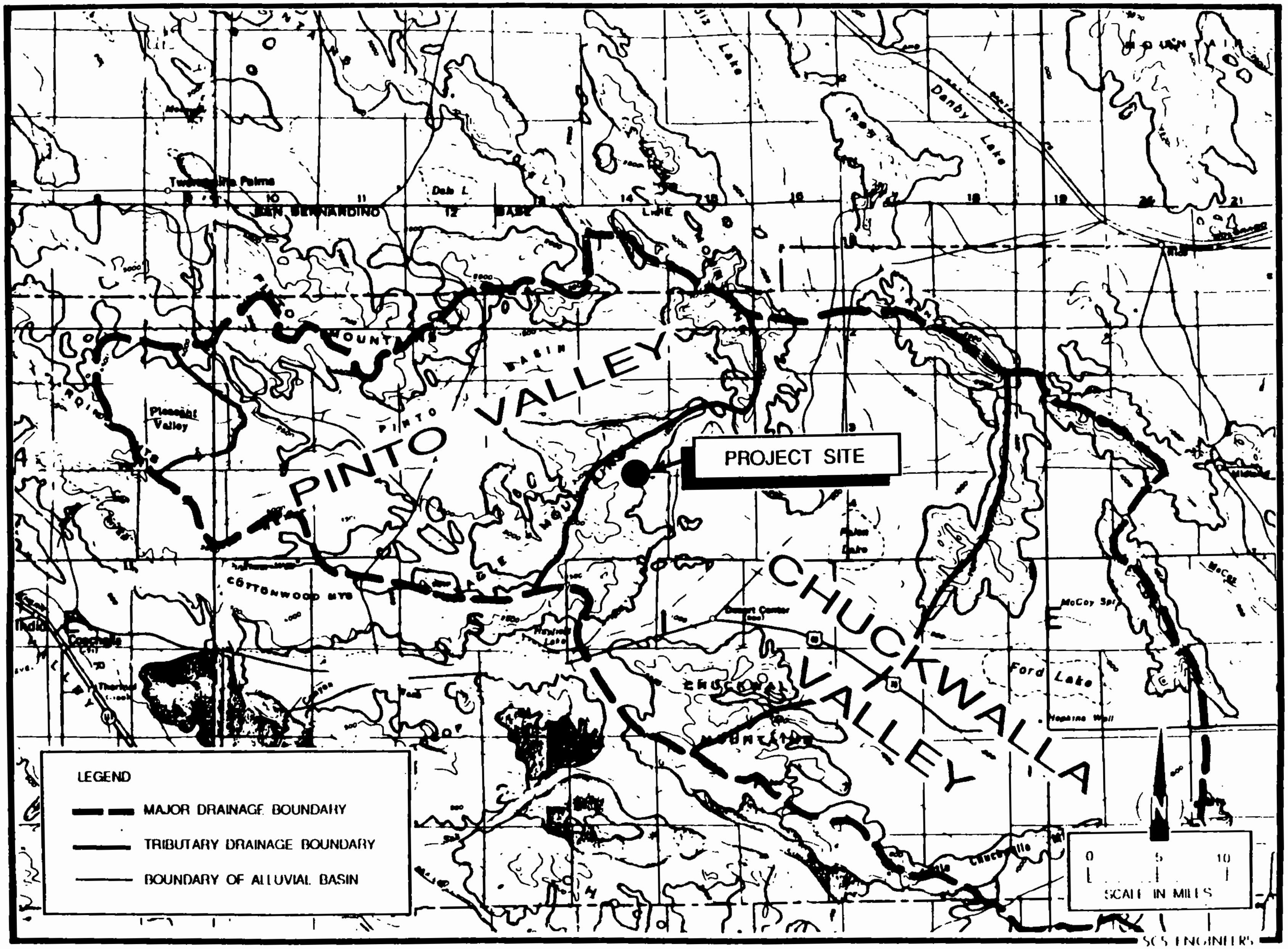


Figure 1. Chuckwalla Valley and Pinto Valley Ground Water Basins.

Drainage in the western part of the Chuckwalla Valley flows generally southeasterly towards Palen Dry Lake. Drainage from the eastern part of the Chuckwalla Valley is towards Ford Dry Lake. Stream flow within the project area is discussed in the section on Drainage.

Ground Water Basins--

Ground water basins in the area include the Pinto Valley basin, which lies about 4 miles north of the proposed landfill site, and the Chuckwalla Valley basin, which adjoins the site on the east (Figure 1). Aquifers in these basins consist principally of Quaternary alluvium. The mountain areas adjoining these basins are underlain principally by older igneous and metamorphic rocks of low matrix permeability and porosity. Basic hydrogeological data on these basins is summarized in Table 1.

Pinto Basin--The Pinto basin covers 310 square miles most of which is within Joshua Tree National Monument. This ground water basin is estimated to have a storage capacity of 230,000 acre-feet, and a usable capacity of 130,000 acre-feet (California Department of Water Resources, 1975). Ground water from this basin has only very limited uses at present. Kaiser Steel pumped between 2,300 and 3,900 acre-feet of water per year from two wells (Kaiser Pinto wells) during the years between 1962 and 1982. These currently inactive and unusable wells are located 1/2 mile northwest of the point at which the Pinto Valley joins the Chuckwalla Valley (Mann, 1967).

The most complete description of the hydrogeology of the Pinto basin to date is found in Kunkel (1963). Ground water flow in the basin is generally towards the eastern end of the valley; from there, it proceeds southward as underflow into the Chuckwalla Valley. Water level in the northernmost of the Kaiser Pinto wells (Well No. 3S/15E-4K) was measured at approximately 122 feet below ground surface (elevation 936 feet above mean sea level) on September 11, 1989.

The numbering system for this well (3S/15E-4K), as well as others mentioned in this document, is based on the location of the well. The numbers refer to the location of a well within the standard U.S. land survey grid. Location is amounts of water. One well was observed that delivered in excess of 5500 gallons per minute on an initial developing test. This yield was obtained using six stages of 14 inch high capacity bowls with quad-GMC diesel engines for motive power. The engines were capable of delivering 380 HP to the shaft driven geared head and pump. It was noted that draw down factors were not excessive. Yields such as these are not to be considered excessive due to the fact that the energy components in the Chuckwalla Valley storage basin are more or less still in a virgin state. It is estimated that less than 20,000 acre feet of water has been withdrawn from this storage area to date.

Normal development of water for expansion of agriculture, domestic and industrial uses, could not possibly dewater the basin aquifers in the foreseeable future. The average loss of hydrostatic head to date, in most wells, has been about one-half to one foot per year. A total of 20 wells have been drilled in the central portion of the Chuckwalla Valley. Presently only 5 of these wells are on active status producing water mainly for agricultural purposes. Future development and demand will undoubtedly see all of these wells placed in the active category.

The complete area of the Chuckwalla Valley storage basin has been estimated to embrace some 112 square miles, with a storage capacity of 71,680 acres. This storage area extends from the northernmost confines of the valley to the southeast end near the western limits of Palen Dry Lake (see Ground-Water Flow Map). The demarcation point is considered to be the point of hydro-chemical interface between the fresh waters of the Chuckwalla Valley and the more saline fluids confined in the Palen Dry Lake Area (see 1960 Report, Page 14).

An average of 28 percent porosity for the total volumetric mass has been used in estimating the water reserves, and only 70 percent of the fluid in place has been considered to be producible. The average saturated permeable sand count has been conservatively placed at 475 feet.

WATER RESERVES - CHUCKWALLA VALLEY

6,134,464 Estimated Acre Feet of Water

Considering estimated future demands will withdraw 100,000 acre feet per year,

then,

Available Water Supply = 61 years.

The above, of course, is not realistic because the water demand will increase only gradually as the different facets relative to the usage of water increases. A more realistic approach would be to estimate the complete dewatering of the storage area in some 120 years. This, of course, precludes the systematic development and drilling of additional water wells to drain all the aquifers in this storage area.

The above fluid reserve estimate must also be increased by the estimated 20 percent inflow into the upper Chuckwalla Valley basin from the storage area of the Pinto Basin.

Thus,

CHUCKWALLA VALLEY WATER RESERVES

6,134,464 Acre Feet of Water

161,056 Acre Feet of Water - Estimated Inflow - Pinto Basin

6,295,520 Total Acre Feet Water Available - Chuckwalla Valley

NEW WELL FIELD

A new well field is proposed to supplement the water supply of the Kaiser Steel Corporation in the north central portion of the Chuckwalla Valley. This new location has been selected because of its proximity to Kaiser's mining operation and also to insure adequate aquifer development and storage capacity to sustain water production for many years.

The recommended location for the new well field is the N 1/2 of Section 10, T. 4 S., R. 15 E., SBBM (See Map - Appendix). The following recommendations are offered relative to the well field.

1. Wells should be drilled to a depth of at least 900 feet.
2. Electric logs should be obtained to determine saturated zones and permeable sand count.
3. Well design and construction should be of the gravel envelope type.
4. Casing and perforation design should be adequate to insure the life of a well for at least 30 years.
5. Individual wells should be produced at a maximum efficient ratio, estimated not to be in excess of 1200 gallons per minute.
6. Two new wells should be drilled to insure an added 2000 to 2200 gallons per minute production. These wells should be spaced at least three-eighths of a mile apart.
7. Specific capacity of the wells should be determined during development tests.
8. Permanent installation should be designed and protected from weather elements.

WATER RESERVES - North Central Chuckwalla Valley

The proposed new well field will have a primary storage area of 25 square miles, or 16,000 acres. From projected stratigraphic elements and the "C K" wells drilled by Kaiser Steel Corporation, it has been estimated that at least 400 feet of saturated permeable rocks may be present in this new suggested area. Applying the same formula as used in computing the reserves for the Chuckwalla Valley proper, a total of 1,254,000 acre feet of water has been assigned to this storage area. One must also consider the inflow into this area from the Pinto Basin storage reservoir. These fluids must be considered as almost wholly available to the proposed new well field.

Therefore,

1,254,400	Acre Feet of Water in the Northern Chuckwalla Valley Storage Basin
161,056	Acre Feet of Inflow from Pinto Basin
1,415,456	Acre Feet of Water Available.

Ultimate production estimated at 4000 gallons per minute (4 wells = 18 acre feet per day).

18 acre feet per day = 6570 acre feet per year.

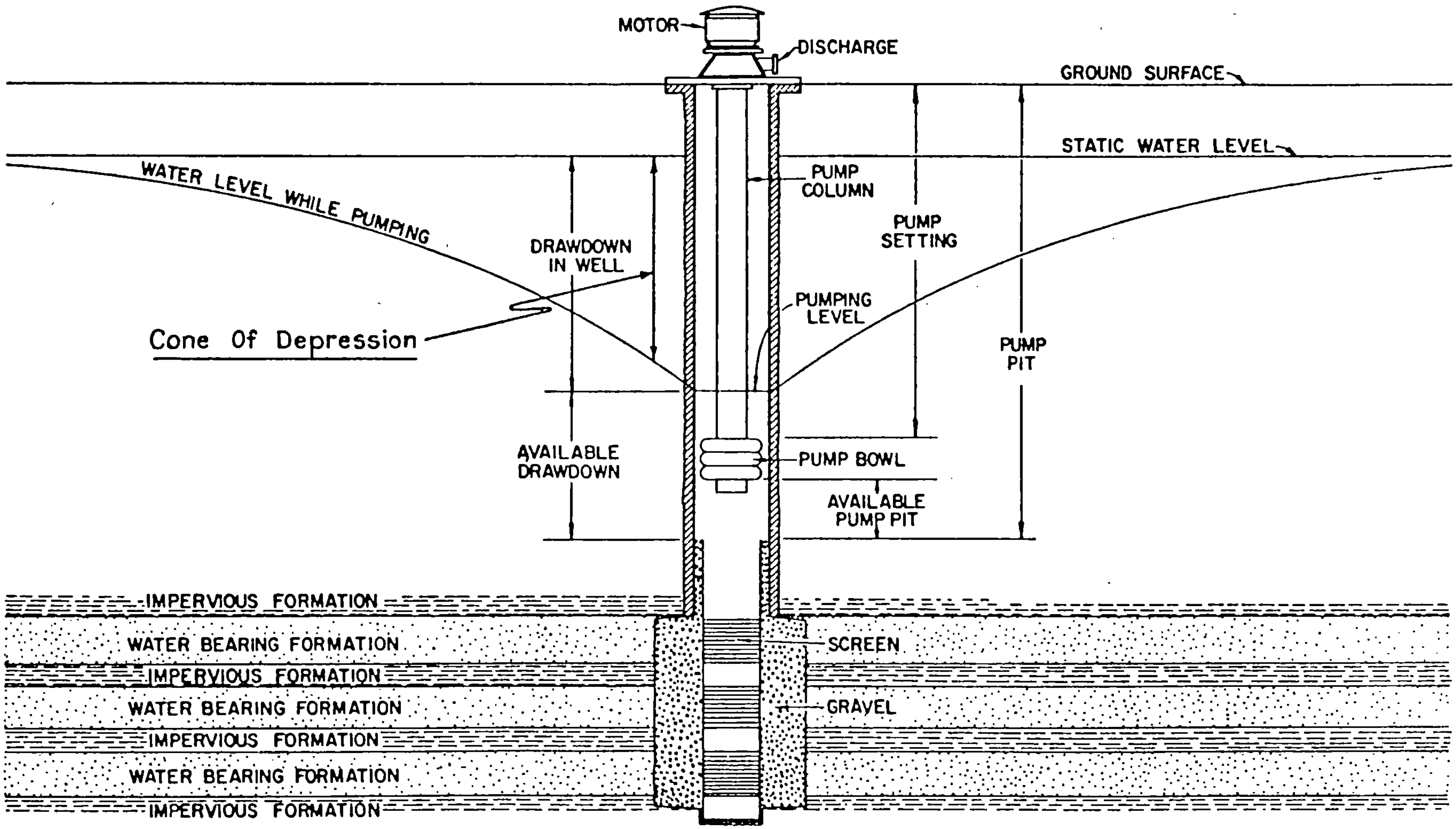
Then, producing

6,570 acre feet per year = complete dewatering of storage in approximately 215 years.

The above precludes the systematic development of well fluids to drain the entire storage area.

Respectfully submitted,

Arthur F. Peterson
Geologist - Engineer
California License #501



WATER WELL SYSTEM

News Release

Office of the State Controller - Gray Davis

300 Capitol Mall, 18th Floor
Sacramento, CA 95814

Contact: Edd Fong (916)445-1895

(PD.A

9/12

FOR RELEASE:
September 7, 1989
7:00 a.m. EDT

CALIFORNIA CONTROLLER URGES ADOPTION OF "VALDEZ PRINCIPLES"

SACRAMENTO -- California Controller Gray Davis today joined New York City Comptroller Harrison J. Goldin in urging American corporations to adopt the "Valdez Principles," a set of business guidelines developed by national environmental organizations, including the National Audubon Society, the National Wildlife Federation, and the Wilderness Society.

Controller Davis is a trustee of the California Public Employee's Retirement System (CalPERS), the largest public employee pension fund in the U.S. with assets exceeding $55 billion, and California's State Teachers Retirement System (STRS) with $28 billion in assets. Davis is also co-chair of the Council of Institutional Investors, a national organization comprised of more than 60 large public and union pension funds.

Attached is Controller Davis' statement.

# # # # #

ef:89:92

SUBMITTED AT COUNTY SCOPING MEETING AT [illegible]
Sept. 14, 1989

News Release

Office of the State Controller - Gray Davis
6300 Wilshire Blvd., Suite 1270
Los Angeles, CA 90048

Contact: Daniel Zingale (213) 852-5213

STATEMENT BY CALIFORNIA CONTROLLER GRAY DAVIS
September 7, 1989

The "Valdez Principles" offer an unprecedented opportunity for corporate America to actively demonstrate to investors and to consumers their commitment to a clean and healthy environment. I urge them to seize the opportunity.

I will propose these guidelines to California's retirement systems and to the state Legislature. I believe California and other state pension funds should adopt these standards in their corporate governance voting policies.

Protecting the environment is not only good public policy, it's also good for business. It is clear from the numerous oil tanker accidents this year, including the one for which these principles are named, that insufficient attention has been paid to environmental protection.

Efforts to prevent disasters may seem costly, but they are a bargain compared to the price of these accidents. The cleanup costs in Alaska alone will exceed $1 billion. The cost of cleanups and liability suits is the price companies and investors pay for not including environmental protection in their corporate planning. Adopting the "Valdez Principles" will protect shareholders from environmental and financial catastrophe.

One important component is the appointment of at least one director to corporate boards who is qualified to represent environmental interests. Knowledge of advances in environmental and health science would benefit companies and shareholders. On June 5, 1989, New York City Comptroller Jay Goldin and I called on six major oil and chemical companies to name a director with significant environmental expertise and to establish an internal structure to more closely monitor these issues. I am pleased that these principles include pledges to do both.

By supporting these principles, institutional and individual shareholders can also demonstrate our commitment to reducing the health and safety risks to employees and communities. We recognize the cumulative cost of day-to-day practices that endanger workers and spoil our neighborhoods. Corporate managers must protect workers and fully disclose operations that may place employees and communities at risk.

The Social Investment Forum

711 Atlantic Avenue, Boston, MA 02111 617-451-32--

C.E.R.E.S. PROJECT

Coalition for Environmentally
Responsible Economies

VALDEZ PRINCIPLES STATEMENT OF INTENT

With these Principles, The Coalition for Environmentally Responsible Economies, or the CERES project of the Social Investment Forum, sets forth broad standards for evaluating activities by corporations that directly or indirectly impact the Earth's biosphere. The CERES Project has created the Valdez Principles to help investors make informed decisions around environmental issues. As representatives of the investment and environmental communities we are asking corporations to join with us by subscribing to these Principles.

Recognizing the complexity of the issues contained in these broad Principles, CERES has attempted to define the Principles as a long term process rather than a static statement. CERES members hope that signatory companies will work with us on the elaboration of the specific requirements of these Principles. Our intent is to create a voluntary mechanism of corporate self-governance that will maintain business practices consistent with the goals of sustaining our fragile environment for future generations, within a culture that respects all life and honors its interdependence.

We ask for a long term commitment to the process of compliance with these Principles, and an additional commitment of assistance and cooperation in the further development of specific standards derived from each of these general principles.

The Social Investment Forum
711 Atlantic Avenue, Boston, MA 02111 617-451-323

C.E.R.E.S. PROJECT

Coalition for Environmentally Responsible Economies

For Release September 7, 1989

VALDEZ PRINCIPLES

Introduction

By adopting these principles, we publicly affirm our belief that corporations and their shareholders have a direct responsibility for the environment. We believe that corporations must conduct their business as responsible stewards of the environment and seek profits only in a manner that leaves the Earth healthy and safe. We believe that corporations must not compromise the ability of future generations to sustain their needs.

We recognise this to be a long term commitment to update our practices continually in light of advances in technology and new understandings in health and environmental science. We intend to make consistent, measurable progress in implementing these principles and to apply them wherever we operate throughout the world.

1. Protection of the Biosphere

We will minimize and strive to eliminate the release of any pollutant that may cause environmental damage to the air, water, or earth or its inhabitants. We will safeguard habitats in rivers, lakes, wetlands, coastal zones and oceans and will minimize contributing to the greenhouse effect, depletion of the ozone layer, acid rain, or smog.

2. Sustainable Use of Natural Resources

We will make sustainable use of renewable natural resources, such as water, soils and forests. We will conserve nonrenewable natural resources through efficient use and careful planning. We will protect wildlife habitat, open spaces and wilderness, while preseving biodiversity.

3. Reduction and Disposal of Waste

We will minimize the creation of waste, especially hazardous waste, and wherever possible recycle materials. We will dispose of all wastes through safe and responsible methods.

4. Wise Use of Energy

We will make every effort to use environmentally safe and sustainable energy sources to meet our needs. We will invest in improved energy efficiency and conservation in our operations. We will maximize the energy efficiency of products we produce or sell.

5. Risk Reduction

We will minimize the environmental, health and safety risks to our employees and the communities in which we operate by employing safe technologies and operating procedures and by being constantly prepared for emergencies.

6. Marketing of Safe Products and Services

We will sell products or services that minimize adverse environmental impacts and that are safe as consumers commonly use them. We will inform consumers of the environmental impacts of our products or services.

7. Damage Compensation

We will take responsibility for any harm we cause to the environment by making every effort to fully restore the environment and to compensate those persons who are adversely affected.

8. Disclosure

We will disclose to our employees and to the public incidents relating to our operations that cause environmental harm or pose health or safety hazards. We will disclose potential environmental, health or safety hazards posed by our operations, and we will not take any action against employees who report any condition that creates a danger to the environment or poses health and safety hazards.

9. Environmental Directors and Managers

At least one member of the Board of Directors will be a person qualified to represent environmental interests. We will commit management resources to implement these Principles, including the funding of an office of vice president for environmental affairs or an equivalent executive position, reporting directly to the CEO, to monitor and report upon our implementation efforts.

10. Assessment and Annual Audit

We will conduct and make public an annual self-evaluation of our progress in implementing these Principles and in complying with all applicable laws and regulations throughout our worldwide operations. We will work toward the timely creation of independent environmental audit procedures which we will complete annually and make available to the public.

Los Angeles Times Friday, September 8, 19

Environmentalists Unveil List of 'Valdez Principles'

From United Press International

NEW YORK—The Valdez principles, to be used by investors as a measure of a corporation's commitment to safeguarding the environment, were announced Thursday by an environmental and social coalition.

The Coalition for Environmentally Responsible Economies, or CERES, said the 10 principles would be immediately circulated among major U.S. corporations for signatories.

CERES said it would monitor the adherence to the principles by corporations, whether they are signatories or not, and make public the results.

"This is a way for us to use our clout as consumers and investors to influence the way corporations deal with the environment," said New York City Comptroller Harrison J. Goldin, who is a candidate for the Democratic nomination for mayor of New York.

Goldin said the city would incorporate the principles when considering its pension fund investments.

California Controller Gray Davis said in a press statement that he would propose to the state Legislature that it adopt the standards for California state pension fund investments.

The principles, named for the environmentally disastrous oil spill from the Exxon oil tanker Valdez in the Gulf of Alaska in March, address the release of pollutants, sustainable use of natural resources and reduction and disposal of waste.

Representative on Boards

They also address energy efficiency, risk reduction to employees and surrounding communities, the marketing of safe products and services, damage compensation and disclosure of potential environmental hazards.

The inclusion of an environmental representative on corporate boards and annual corporate environmental audits are also called for by the Valdez principles.

Joan Bavaria, co-chairperson of CERES, said the coalition's membership represents some $100 billion in invested assets.

CERES said the Valdez principles are not intended as a disinvestment effort nor is it a negative campaign.

Rather, the coalition said it seeks to reward corporations that behave in a positive manner on environmental issues through the support of investments by individuals and pension plans.

The Valdez principles were drafted by the Sierra Club, the National Audubon Society and the Social Investment Forum, a national trade association of money managers, brokers, bankers and analysts.

MWD

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Office of the General Manager

August 2, 1988

Trigg and Dorothy Rourke
Coordinators
Senior Center of Lake Tamarisk
P.O. Box 7102
Desert Center, California 92239

Dear Mr. and Mrs. Rourke:

Storage of Excess Water in the
Abandoned Open Pit Mines at Eagle Mountain

Your letter of July 6, 1988 was referred to the Resources Division for response. Metropolitan appreciates the concern shown by individual citizens as it relates to the future water supply resources of Southern California. With regard to your suggestion, several times in the past Metropolitan has evaluated the possibility of storing excess Colorado River water at various locations in the desert along the aqueduct route. In all but one case, such projects have been found to be prohibitive for any of a number of reasons. Your suggestion that the abandoned pit mines be used for water storage has been reviewed, and for the following reasons, is considered infeasible.

From what is known of the geology of the Eagle Mountain area, it is likely that any water placed in the mine pits would infiltrate rather quickly through the bottom and eventually into the aquifer below. In some similar situations, such as the Coachella Valley, Metropolitan takes advantage of such a phenomenon and uses the aquifer as an underground storage reservoir for excess surface water when it is available. Similarly, the aquifer at Eagle Mountain would be the probable destination of water placed in Kaiser's open pits. Thus, rather than a traditional surface reservoir, your suggestion would likely result in storage underground in the aquifer.

The water carried in Metropolitan's Colorado River Aqueduct is obtained entirely from the Colorado River. You are correct in noting that Metropolitan owns a well near

Eagle Mountain which draws on the local groundwater supply. The right to use water produced by this well is leased to Kaiser Steel for uses related to its mining operations. Metropolitan retains only the right to use water from the well under limited circumstances.

Prior to the early 1980s, this well was used by Kaiser in part for domestic water supply purposes, principally the needs of the Eagle Mountain School. However, the State Department of Health Services ordered that, because certain naturally occurring constituents in the well water exceeded the State's newly adopted standards for such uses, an alternative domestic supply for the school had to be located. Currently, as a result of the State's order, Kaiser uses this well only for its own industrial purposes. None of the well water is placed in the Colorado River Aqueduct by Metropolitan, nor is it used for any domestic purposes as far as we are aware. Like many aquifers located in southeastern California's desert areas, naturally occurring mineralization has made the water it contains unacceptable for human consumption.

School well ?

constituent State

Mixing excess Colorado River water with the groundwater already present in the aquifer would result only in a larger pool of groundwater which could not be used by Metropolitan or anyone else for domestic purposes. Even if sufficient industrial demand for such low quality water existed in our service area, the State would prohibit Metropolitan from transporting it in our existing aqueduct system due to the poor quality. It is for these reasons that Metropolitan does not regard the project you suggest as feasible.

Once again, I appreciate your interest in the water supply future of Southern California. If we can be of assistance again, please feel free to contact me.

Very truly yours,

Richard W. Atwater

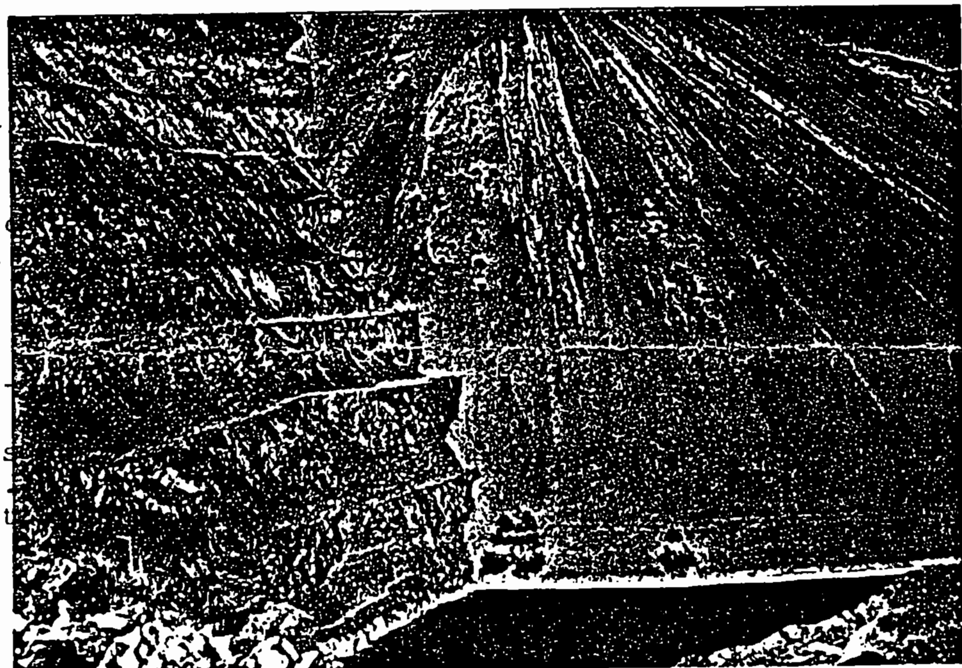
Richard W. Atwater
Director of Resources

JVD:asj

another bigger pit with

← Residue

East pit at Eagle Mt. In this 1987 picture, ground water is plainly visable & several palm trees are seen. This is the pit that the Mine Reclamation Corp. plans to use as a garbage dump. We believe that the water is connected with the 9 million 100 thousand acre ft. aquifer in the Chuckawalla Valley.



← Trees

← Water

↑ Water

A Calif family uses ½ acre ft. a year.

RECEIVED

SEP 08 1989

MWD

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

RIVERSIDE COUNTY PLANNING DEPARTMENT

SEP 6 1989

Mr. David Mares, Project Planner
Riverside County Planning Department
4080 Lemon Street 9th Floor
Riverside, California 92501

Dear Mr. Mares:

Notice of Preparation
of Environmental Impact Report
Eagle Mountain Solid Waste Disposal Facility

We have received your Notice of Preparation for the above-referenced project. The proposed project would entail development of a regional Class III solid waste disposal facility in the Eagle Mountains northwest of Desert Center. The project would require approval of a general plan amendment, zoning change, and specific plan. The comments herein represent Metropolitan's response as a potentially affected public agency.

Our review of the project site indicates that Metropolitan's Colorado River Aqueduct lies in close proximity to the proposed project location. The aqueduct is a major source of imported drinking water for Metropolitan's service area of 14.7 million people.

Since the aqueduct is an open water conveyance in the vicinity of the proposed project, water quality is a concern that should be addressed in the EIR. Specific concerns include the possible attraction of birds to the dump, and consequently to the nearby aqueduct, one of the few water sources in the area. Possible impacts on aqueduct water quality from wind-blown contaminants should be investigated. The effects on groundwater underlying the site should also be addressed.

We appreciate the opportunity to provide input to your environmental planning process. Questions regarding Metropolitan's facilities or rights-of-way should be directed to Mr. James Hale, Senior Engineering Technician at (213) 250-6564. Water quality questions should be addressed to Mr. Edward Means, Associate Director of Water Quality, at (213) 250-6412.

Very truly yours,

RLSoltz

Roberta L. Soltz, Ph.D.
Environmental Branch Head

JMG/ms

NI

Southern California Edison Company

P. O. BOX 788
RIALTO, CALIFORNIA 92376
2885 FOOTHILL BOULEVARD
SAN BERNARDINO, CALIFORNIA 92402

JOHN D. WYATT
REGIONAL AFFAIRS MANAGER
EASTERN DIVISION

TELEPHONE
(714) 820-5236

RECEIVED
SEP 07 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

August 31, 1989

David Mares
County of Riverside Planner
4080 Lemon Street, 9th Floor
Riverside, CA 92501

Subject: Eagle Mountain Project
Environmental Impact Report

Mr. Mares:

This is to advise the County of Riverside that the subject area is located within the service territory of the Southern California Edison Company and the associated electrical load growth is within the parameters of the overall projected load growth which we are planning to meet in this area.

Unless the demand for electrical generating capacity exceeds our estimates, and provided that there are no unexpected outages to major sources of electrical supply, we expect to meet our electrical requirements for the next several years.

Very truly yours,

J. D. Wyatt

J. D. Wyatt

JDW/kag
EglMtn.JDW

cc: B. R. Hicks

PD.A

C. G. Boyd & Associates
7548 LAKESIDE DRIVE
RIVERSIDE, CALIFORNIA 92509
(714) 681-2954

SUBJECT: Landfill Alternative

TO:

M's,

There's much said about what should be to clean up our household and industrial garbage, and what to do with our hazardous materials. While others are advocating "Not in my back yard" and others advocating disposal and distruction without air or water pollution. But regardless of how we deside to dispose of our waste, it must be remembered that any system designed to do the job must go someplace.

Most of those involved in waste management either seem to be spending much of their time looking at limited systems or alocating funds towards a short term solution only, because mostly due to the immediate political presures. Others order systems with limited capabilities, or authorize measures that are limited in solving the overall problem they are faced with, such as what happened to the Springfellow site. Many of which prove later to be more costly than effective, but where all give little or no return to the community which pay for them.

We at C.G. BOYD & ASSOCIATES, with our small staff with over 100 years of combined experience in waste management, do not claim to have all the solutions to every environmental problem, nor will we ever solve all the worlds environmental problems, but we do believe with this kind of experience we are unlike most waste management consulting firms you fine today, we have available the data and experteese to not only examine your needs but to put in place permanent high tech systems that will not only do what you want, but do it with zero pollution to the air and zero contamination to the ground water.

Why this letter. Because we want to introduce and make available to you, your staff and all the communities in southern California the most advance fully INTEGRATED TREATMENT FACILITY available.

A system designed from proven systems the world over. System designed for zero pollution and where landfilling is never a required solution for our garbage waste. Where household, industrial and other hazardous wastes material are totally processed or destroyed without emmiting air contaminets or having to place residue into the soil. Where all types of waste products are handle at one full service operation, whether it be non-hazardous or hazardous classified, the first time, where duplication is eliminated and where your waste problems will not reappear 10 to 100 years later.

First, we will design a main system to meet the total needs of the community and the counties using it, with built in capabilities to expand with your needs, using only the vary latest proven technologies in waste disposal and processing, and a couple of ideas of our own. A system that is 90% self-contained, recycles up to 65% of all types of waste received, a system that gives back to the community through good service, low cost energy, and a portion of the profits derived from recycled products.

Second, 21 transfer stations or pick-up points, each self-contained and self supporting, each non-polluting, located through-out Riverside, San Bernardino Counties and some parts of Los Angeles and Orange Counties. So that the need for added disposal trucks can be reduced, and so that no community disposal truck will travel more than 10 mile to and from each pick-up point. Where all non-hazardous and hazardous transporters will never be required to travel over our streets and highways more than 20 miles. Where any long distance hauling will become something of the past and where landfills no longer be a requirement for our waste.

We need 30 minutes to present this most unusal plan to you and those you represent. So that we can show how its possible in this age to dispose and process all types of waste with zero pollution to the air or water. And of-course - we will need time to answer a few questions.

So before you buy or authorize a new system, before you throw more dollars into a landfill, give us a call at (213)583-4961 or leave a message on the recorder at (714) 681-2954 we will be happy to present our proven plan at your convience.

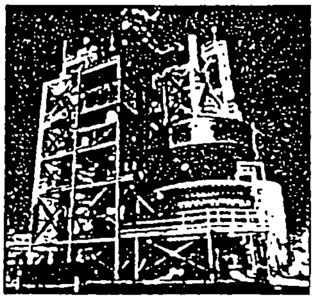
Sincerely,

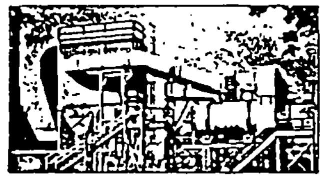
C G Boyd

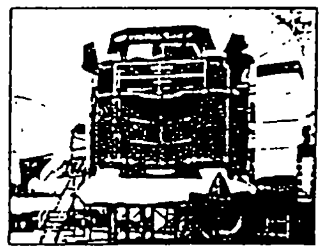
CHARLES G BOYD
SR. CONSULTANT

Don't Bury Your Problems BURN THEM

More efficient equipment quells some of the fiery opposition to incineration







Clockwise from top: Keeler fluidized-bed incinerator, C-E system, Huntington regenerative fume unit, Reeco equipment and McGill facility

Incineration may soon be the method of choice for municipal and industrial waste disposal. When that will happen is difficult to predict. But it's already apparent the growing scarcity of land, the potential hazards of groundwater contamination, prohibitive costs and stringent governments will severely restrict landfills as a viable, long-term option for hazardous waste disposal.

Whether using kilns, drums or fluidized beds, incineration is still politically controversial and one of the more expensive disposal methods. But it has become the only technically and environmentally sound method for many types of waste products.

The rotary kiln incinerator can handle the widest range of waste — liquids, solids, sludges, as well as containerized and drummed waste. In fact, rotary kilns are often used by operators of off-site toll incinerators because of their versatility. Appropriate for large-volume applications, the rotary kiln also tends to be one of the more expensive of incinerator technologies.

C-E Raymond, a subsidiary of Combustion Engineering, Inc. (Chicago, Ill.), recently expanded its kiln offerings to include slagging as well as non-slagging rotary kilns. The difference between these technologies, according to C-E Raymond, is not so much the hardware but the way it is operated. Varying the temperature and/or composition of the waste will determine whether a rotary-kiln incinerator generates primarily molten slag or solid ash.

Non-slagging kilns usually operate at about 1,800°F, whereas slagging kilns require temperatures as high as 2,200°F. This higher temperature allows a slagging kiln to handle an entire drum. The drum is merely perforated and then fed into the kiln; the high temperature softens the drum, releasing its contents. Molten slag leaving the kiln is then quenched in water to form a non-leaching glass-like material.

The high temperature in a slagging kiln can improve destruction of the waste, but it also shortens the life of the refractory by as much as several thousand hours. Replacement of the refractory is often the primary maintenance expense of a slagging kiln. As with many type of incinerators, the gas leaving rotary kilns often passes through a secondary combustion chamber to meet federal requirements for temperature and residence time.

The versatility of rotary-kiln technology is being demonstrated by Roy F. Weston Co. (West Chester, Pa). The company has built a mobile rotary-kiln incinerator that is being readied to clean up 7,500 tons of polychlorinated biphenyl-contaminated soil at a Superfund site.

Also a manufacturer of rotary-kiln incinerators for large users, McGill Environmental Systems, Inc. (Tulsa, Okla.), a subsidiary of International Technology Corporation, has developed an incineration technology specific for smaller waste generators. Designed to destroy wastes stored in drums, its modular Drummed Waste Disposal System can accommodate 1 to 4 drums per day; by adding modules, it can incinerate up to 16 drums per day. The drums may contain almost anything — solids, liquids, sludges or slurryies.

A batch operation, the system subjects two drums to intense heat in a refractory-lined furnace to vaporize the waste. Incineration of the vapors is then completed in a secondary combustion chamber. A lance assures that all contents of each drum are vaporized. What's more, the single-module drum incinerator is about one-third the price of a small rotary kiln.

FLUID BEDS AND BOILERS

The thermal fluid bed can incinerate a wide range of industrial liquids, sludges, and solid wastes. Filled with an inert, fluidizable material such as sand, a fluid bed offers good mixing and near-isothermal operation. Bed temperature can be controlled by the temperature of the fluidizing air or with heat transfer coils in the bed itself.

A fluid-bed incinerator usually has lower operating and maintenance costs than a rotary kiln, but can't handle large chunks of waste or waste that will melt and disturb fluidization. Because the large mass of material heats or cools slowly, fluctuations in feed composition cause little change in bed temperature. The refractory is not continually subjected to thermal shock.

The thermal fluid bed also lends itself to intermittent operation. Because the reactions of combustion and water evaporation are virtually instantaneous, there is a very low inventory of fuel or feed anywhere in the system, permitting startups and shutdowns in a matter of minutes when the combustor is near operating temperature. Makers of fluid-bed incinerators as well as boilers, Keeler/Dorr Oliver (Williamsport, Pa.) specializes in products that offer reduced energy consumption. Its systems can be designed to preheat incoming combustion air, reducing or eliminating the need for auxiliary fuel. System can also be designed to offer energy recovery through the use of in-bed heat recovery tubes.

Another boiler manufacturer, the Cleaver-Brooks Div. of Aqua Chem, Inc. (Milwaukee, Wis.), also combines its boiler experience with incineration technology. Using a rotary kiln linked to a heat recovery boiler, its waste-incinerator systems often have steam production as the primary project objective.

When the waste is limited to liquid or gas, less complex options are available. T-Thermal, Inc. (Conshohocken, Pa.) produces liquid incinerators geared specifically to the chemical process industries. The company has handled myriad liquid and gas wastes, including chloro- and fluorohydrocarbons and dioxins.

At the heart of T-Thermal's incinerator is a vortex burner. Unlike conventional burners, it achieves high-intensity, high heat release with a short flame length. Combustion is achieved primarily in the combustion chamber before it gets to the flame. The vortex burner operates in a small chamber and can be fired by multiple fuels. The burner has also been used in rotary kilns for incinerating polychlorinated biphenyls and other chlorinated phenolics.

Historically, fume incinerators were costly in terms of energy consumption since they had to heat a lot of air just to burn a small amount of solvent vapors. Regenerative fume incinerators, however, are now available that meet stringent governmental air-quality regulations and they offer the added advantage of high thermal efficiency.

An early entrant into the regenerative fume incinerator market, Regenerative Environmental Equipment Co. (REECO) headquartered in Morris Plains, N.J., uses multiple energy-recovery chambers packed with inert material to recover heat from the incinerator's exhaust to preheat the incoming fume-laden air.

REECO is able to achieve up to 95% thermal efficiency when handling solvent-contaminated air at 3% of its lowest emission level, incineration can be sustained by the pilot.

To clean the regenerator packing of organic buildup, a bake-out cycle can be used. To remove inorganic contamination, the packing is removed and "vacuum-cleaned."

Using ceramic saddles as packing for the regenerators, fume incinerators from Huntington Energy Systems, Inc. (Union, N.J.) require no external fuel if the solvent concentration is above 25% lowest emission level. These devices also use a single speed-reducer valving system to reduce maintenance of the only moving parts in the fume incinerator.

Incinerator manufacturers seem to have few exclusive technologies. But each does have specific experience and they believe that is what is most important to their customers. Also, incinerator manufacturers favor specifications based on performance, not features. "If you need 99.99% or 99.9999% removal," says one, "that's what the manufacturer needs to know ... not all the design features you think you may need."

For more information on products and services covered in this section, circle the number at the end of each item, on the reader service card

C-E Raymond, Combustion Engineering, Inc., Chicago, Ill. (525)
Cleaver-Brooks Div., Aqua-Chem, Inc., Milwaukee, Wis. (526)
Huntington Energy Systems, Inc., Union, N.J. (527)
Keeler Dorr-Oliver, Stamford, Conn. (528)
McGill Environmental Systems, Inc., Tulsa, Okla. (529)
Regenerative Environmental Equipment Co., Morris Plains, N.J. (530)
Roy F. Weston Co., West Chester, Pa. (531)
T-Thermal, Inc., Conshohocken, Pa. (532)

Looking to purchase incineration equipment? Check the manufacturers in the Chemical Engineering Equipment Buyers' Guide.

The Point Is...

No. 121, September 23, 1988

A SUMMARY OF PUBLIC ISSUES IMPORTANT TO THE DOW CHEMICAL COMPANY

There is a Solution to the Garbage Glut

Every day the typical American throws out more than four pounds of newspapers, ketchup bottles, soup cans, old clothing, etc., into a plastic trash bag for the garbage collector to haul away. After this garbage heads for the dump, it no longer concerns most people.

However, when that four pounds a day is added to the garbage being thrown out by all Americans, it becomes part of the 150 million ton mountain of municipal solid waste generated annually in the United States. In cities where waste managers are struggling to find some place to put this endless accumulation of trash, it then creates a garbage crisis. Waste disposal in many highly populated areas of the United States is a significant problem because current solid waste management practices haven't kept pace with population growth, the proliferation of consumer goods and environmental awareness.

As part of our commitment to protecting the environment, our products must satisfy both functional and disposal requirements.

Dow is concerned about solid waste because we are a leading manufacturer of materials used to produce packaging and durable goods. Since all products eventually end up in the waste stream, we are part of the solid waste challenge. As part of our commitment to protecting the environment, our products must satisfy both functional and disposal requirements. Further, our product stewardship philosophy includes ensuring that our products are used and disposed of properly. We are committed to being an active participant in developing and implementing solid waste solutions.

We are committed to being an active participant in developing and implementing solid waste solutions.

Today, about 80 percent of the United States' waste goes into landfills, but existing landfill capacity is limited and many are closing because they have failed to protect the surrounding environment. The number of landfills in the country has been cut from 18,000 to 6,000 since 1979. Half of the remaining ones are projected to close in the next five years.

Siting new landfills is next to impossible because nobody wants trash deposited near his or her neighborhood. Given a simple choice, most people opt to have their waste dumped somewhere far away — out of sight and out of mind.

However, putting the problem out of sight won't solve the crisis of what we're going to do with our garbage when landfills close. Instead, it requires rational and urgently applied decisions. Based on the experience of Dow and other industry members in handling manufacturing-generated waste, implementing a comprehensive, integrated solid waste management plan instead of depending only on landfills for disposal is necessary to beat the garbage crisis.

In our manufacturing operations, we use a multi-faceted approach to waste management. Waste is lost product. To protect the environment, conserve resources and improve profitability, we attempt to reuse or recycle potential wastes as raw materials to produce more products. Wastes that cannot be used or recycled are destroyed in an environmentally safe manner. Incineration is our preferred method of destruction, with ash and noncombustibles placed in secure landfills.

The disposal of *municipal* solid waste should be similarly addressed. A successful program would involve finding ways to reduce waste and including an appropriate balance of modern disposal methods. Where feasible, we should recycle materials that can be efficiently and economically recycled, incinerate the bulk of our trash to recover the energy, and use state-of-the-art secure landfills for incinerator ash and noncombustibles. Each disposal method, by itself, offers advantages and disadvantages. When appropriately applied in response to local needs, they present a safe and effective way to handle waste.

Continuing to landfill our garbage can create environmental problems because of the potentially noxious gases and harmful liquids that decomposing materials produce. Recently, the U.S. Environmental Protection Agency announced proposed rules that would require all the United States' municipal landfills to install monitoring equipment to protect the surrounding air and groundwater environment. The EPA predicts that the new rules will require changes at nearly all city landfills and encourage other forms of waste disposal.

Implementing alternatives to landfill use will help preserve the environment and make better use of the United States' resources. For example, waste-to-energy incineration has been used for years to handle municipal solid waste in technologically sophisticated countries such as Japan, Switzerland and Sweden. They're turning their waste problem into a solution for energy needs.

Handling the trash problem poses a challenge that all Americans can pitch-in to solve...

Communities in Oregon, California and New Jersey already separate their trash for recycling. As it becomes more expensive to pay for our trash to be hauled away, this waste disposal option will continue to grow in popularity and be accepted as a necessary way of life. Handling the trash problem poses a challenge that all Americans can pitch-in to solve through participation in efforts such as recycling.

Solid waste has become a problem because our most popular method of disposal — the standard landfill — has become a difficult option. However, we don't have to limit ourselves to this practice.

The point is... workable, practical solutions can be found. The technology for solving our solid waste disposal problem already exists and has been implemented in other countries and in a few U.S. communities. Now, consumers, manufacturers, special interest groups and government representatives nationwide must tackle the solid waste management issue on its various levels, consider the alternatives, and then seek efficient implementation.

162-1089-88

W.D.D, PPA.

RECEIVED
SEP 07 1989
RIVERSIDE COUNTY
PLANNING DEPARTMENT

RIVERSIDE COUNTY PLANNING DEPARTMENT
EAGLE MOUNTAIN SPECIFIC PLAN
SCOPING MEETINGS

Written Comment Form

August 30, 1989

Lake Tamarisk Recreation Center Clubhouse
26-251 Parkview Drive
Desert Center, CA. 92239

Name: Trigg & Dorothy Rourke, Senior Center Coordinators

Address: Desert Center, CA 92239

Phone Number: (619) 227 3137

*Please note that all scoping comments must be received by the County Planning Department by September 18, 1989.

9/5/89

Comments:

1. 9 million, 100 thousand acre ft. of water is under the proposed dump. ½ acre ft. is used by a Calif. family during 1 year. When the water is ruined by the toxic wastes of the garbage, there is NO FIX.

2. History confirms that every garbage dump of household waste has polluted the ground water as though it was from toxic waste dumps.

3. Hydrologist engineers employed by Water Quality Control of Palm Desert have said, "Pollution will come to this aquifer if this folly of a dump persists."

4. MWD aqueduct to LA will be in constant jeopardy of like contamination from seepage, flash floods, human error & earth quakes.

5. A ditch around the garbage site will not ~~dter~~ deter a flash flood.

6. There was a lake & palm trees growing at the bottom of proposed pit. If, after years, the water has dropped, it may be because the water table has dropped at this time. Many farmers have had to drill deeper for their wells. It will return!

7. Garbage separation at home level is imperative for recycling. U. S. is behind other countries. ie Japan recyles 90% of its paper. US, 10%

[redacted]

(OVER)

, Our municipal waste totals 180 million tons a year. Most of it is recyclable.

8. MWD Director of Resources, Richard Atwater, states that the geology of this Mountain area will allow water to infiltrate quickly through the bottom & hence into the aquifer below.

[illegible]

Dear [illegible]

2) [illegible] Bureau of [illegible] Tucson [illegible] [illegible] to [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Urban [illegible] [illegible] development [illegible] applications. [illegible] [illegible] in [illegible] to [illegible] as [illegible]

3) I would [illegible] the [illegible] proposed wilderness designations that [illegible] be forwarded to [illegible] [illegible] [illegible] the Indian and El Camino [illegible] [illegible] [illegible] believe in the multiple use [illegible] [illegible] the [illegible] and also believe that the public lands [illegible] by and through the [illegible] left that [illegible] and not placed in the [illegible] the [illegible] of the [illegible] [illegible]

Thank you in advance for your [illegible]

Sincerely,

[illegible signature]

[illegible]

[illegible]

[illegible]

EAGLE MOUNTAIN LANDFILL EIR/EIS

BUREAU OF LAND MANAGEMENT/COUNTY OF RIVERSIDE
SCOPING MEETINGS

WRITTEN COMMENT FORM

December 6, 1989
7:00 p.m.
Lake Tamarisk Recreation Center
26251 Parkview Drive
Desert Center, CA 92239
(619) 227-3203

If anyone wishes to respond in writing relative to determining the scope of the environmental document for the Eagle Mountain Landfill project, they are encouraged to do so.

Name: R. J. REISTROFFER

Address: P.O. BOX #652 -
DESERT CENTER, CA
92239

Phone Number: 227-3503

Please note that all scoping comments must be received by the Bureau of Land Management by December 20, 1989. Address comments to:

Marianne Wetzel
Bureau of Land Management
Palm Springs-South Coast Resource Area
400 South Farrell Drive, Suite B-205
Palm Springs, CA 92262

12-15-89

Comments: WE DID ATTEND THE FARCICAL HEARING & ARE NOW CONVINCED THAT IT & ANY SUBSEQUENT PERFORMANCES WOULD BE BETTER CLASSIFIED AS WAKES FOR A DEAD HORSE. THE AROMATICS OF COLLUSION REPEATEDLY INDICATED THAT THE STAGED PROCESS HAS LONG BEEN TOWARDS A ROTTEN PRE-DETEMINED GOAL.

FACTUALLY, YOUR DELIVERY LACKED THE FORCE TO ORALLY REGISTER ON ANY OF THE MANY CONCERNED ELDERL[illegible] EARS BEYOND THE FIRST ROW OF CHAIRS.

YOUR PROGRAM-PARTNERS WERE LOUDER, BUT WE[illegible] INCONSEQUENTIAL. THOUGH APPARENTLY PAYROLLED BY DIFFERENT UNIDENTIFIED ALPHABET ORGANIZATIONS T[illegible] TWO PRINCIPALS SEEMED TO HAVE A PRE-ARRANGED PLAN TO INTERRUPT (ALTERNATELY) EVERY RECOGNIZED FLOOR SPEAKER. OF PARTICULAR CONCERN TO ME WAS THE ARBITRA[illegible] MANNER IN WHICH THEY JOINTLY POOH-POOHED THE VERY SERIOUS FACTOR OF IMPACT FROM THE LARIVER DUMP GULL (SPLAT POLITICO) WITH THEIR PRATTLE RE RAVENS.

IF YOU CANNOT FIND BETTER MOUTHPIECES THAN YOU HAD AT DESERT CENTER EVEN YOUR PREPAID PROJECT IS IN BIG TROUBLE. WE WHO MUST AUGMENT OUR HEARING BY LIP-READING [illegible] DEFEATED BY THE HAIRY MESS ON THE FACE OF ONE OF YO[illegible] PERFORMERS. WE CERTAINLY DO NOT LOOK FORWARD TO SEEING, HEARING, SMELLING, ETC.... OF THE DIESEL TRANSPORTER[illegible] HAULING SOCAL FILTH UPGRADE TO THE AIDS STEWPOT.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

215 Fremont Street

San Francisco, Ca. 94105

December 21, 1989

Marianne Wetzel
Bureau of Land Management
Palm Springs-South Coast Resource Area
400 S. Farrell Drive, Suite B-205
Palm Springs, CA 92262

Dear Ms. Wetzel:

The Environmental Protection Agency (EPA) has received the Notice of Intent to prepare an environmental impact report/statement (EIR/EIS) for a right-of-way and land exchange, as part of a proposed waste disposal facility at the Eagle Mountain Mine (BLM CA-25594). We understand from the Federal Register notice that the period for scoping comments will end December 20, 1989. Due to a work backlog exacerbated by displacement of EPA staff from their San Francisco office, which was damaged in the October earthquake, we cannot meet this scoping deadline. Thus we would like to request an extension of the scoping period until January 19, 1990.

Considering the magnitude of the project we feel that it is important that we provide your office with a thorough statement of the waste policy, regulatory, and environmental issues which EPA would like to see addressed in the EIR/EIS. In accordance with the National Environmental Policy Act and Section 309 of the Clean Air Act, the EPA Office of Federal Activities reviews all environmental impact statements issued by federal agencies; thus, it is in the best interests of both the BLM and EPA to clarify our concerns during the scoping phase.

We would appreciate a prompt response to our request for an extension of the scoping period and would also welcome any further information you can provide on the project and upcoming public meetings. All correspondence should continue to be sent to:

Environmental Protection Agency
Office of Federal Activities, E-3
215 Fremont Street
San Francisco, CA 94105

Most EPA staff are temporarily working in their homes until substitute office space can be arranged. If you have any questions about scoping comments or other review procedures, please contact Carolyn Yale, phone 415-658-0921.

Sincerely yours,

Carolyn Yale (for JW)

Jacqueline Wyland, Chief
Office of Federal Activities

United States Department of the Interior

BUREAU OF MINES

WESTERN FIELD OPERATIONS CENTER
EAST 360 3RD AVENUE
SPOKANE, WASHINGTON 99202-1413

TAKE PRIDE IN AMERICA

December 18, 1989

Memorandum

To: Russell L. Kaldenberg, Area Manager, Palm Springs-South Coast Resource Area, Bureau of Land Management, Palm Springs, California

From: Geologist, Branch of Resource Evaluation

Subject: Proposed Right-of-Way and Land Exchange for Proposed Eagle Mountain Mine Waste Disposal Facility

The Eagle Mountain mining district has a total metal production of at least 215 million long tons of iron, 7,257 ounces of gold, 11,768 ounces of silver, 1.13 million pounds of lead, and 114,124 pounds of copper. More than 99.9 percent of this production came from Kaiser Steel Corporation's Eagle Mountain Mine. Although the mine officially closed in late 1982, the term "inactive" used in the Federal Register notice to describe the status of the mine is appropriate. According to the Engineering and Mining Journal International Directory of Mining (1985), the mine still contains 250 million tons of "proved reserves" and 100 million tons of "probable reserves," with a grade of 35 percent iron.

Availability of the mineral resources in the Eagle Mountain area is being restricted, piece by piece, by the Joshua Tree National Monument and the recent Joshua Tree National Park proposals. The proposed waste disposal facility is one more individual action which, by itself, appears justifiable. However, the cumulative effect of all these proposals on mineral resources is one of a major adverse impact.

We believe there is a very real possibility that sometime during the next 100 years (the proposed life span for the landfill) mineral resources at the Eagle Mountain Mine will again become economically viable. Therefore, the Bureau of Mines desires to participate as a cooperating agency for the Environmental Impact Report/Statement to ensure that all potential mineral resource related impacts caused by alternative actions are thoroughly addressed.

Please contact us if you have questions or information regarding cooperating agency status. Thank you for the opportunity to become involved in this issue.

Michael D. Dunn

Michael D. Dunn

Jan. 20 1990

Manager Bureau of L M.

Palm Springs Co. Coast Resource Area

400 South Farrell Drive, Suite B. 205

Palm Springs, Calif. 92262

Sirs or Madam,

I believe no one has any right to ruin any area in California - or anywhere.

Look what they did at Stringfellow Pits!

they promised it would not contaminate the Water too!!

2000 tons of waste per day will contaminate the ground Water which feeds Desert Center, and all of the Coachella Valley!

the water in Desert Center eats thru many pipes etc the a bed of clay will not stop leakage of the poisons in the trash!

why ruin a smog free area which Desert Center is, with the trucks hauling the trash to the pits!

there are so few smog free areas in California lets protect the ones we have!!

Sincerely yours,

O. Agnes Carter

due to medical problem

I live at Death Valley now, but I hope to go back to Desert Center.

My telephone # is:

408-439-5472

Address - J. Agnes Carter
Pinnacle Tree Villa # 208
100 Lockwood Lane
Scotts Valley, CA 95066

City of Palm Desert
73-510 FRED WARING DRIVE, PALM DESERT, CALIFORNIA 92260
TELEPHONE (619) 346-0611

December 13, 1989

The Honorable Patricia (Corky) Larson
Supervisor, Fourth District
County of Riverside
46209 Oasis Street
Indio, California 92202

Dear Corky:

SUBJECT: EAGLE MOUNTAIN MINE PROPOSED LANDFILL

Our Environmental Conservation Manager attended the scoping meeting for the preparation of an EIR/EIS document on the proposed Eagle Mountain mine landfill. At this public meeting, the City of Palm Desert voiced opposition to any alternative which includes trucking solid waste to Eagle Mountain.

Mr. Mark Beizer, a representative of the applicant, M.R.C., indicated that the current project proposal includes a maximum of 4,000 tons per day, or 200 trucks per day, being transported by road. These 200 trucks can significantly impact Coachella Valley's air quality and our freeway's traffic demand.

In addition, the City of Palm Desert is opposed to diesel as the fuel source to transport solid waste by rail. The City of Palm Desert believes electricity should be a more environmentally sound alternate fuel. Palm Desert believes that the trading of one problem, solid waste, for another problem, air quality, in the Los Angeles Metropolitan area is not acceptable.

As mentioned earlier, the City of Palm Desert staff has voiced our concerns at the scoping meeting and will follow with a letter of comments to Bureau of Land Management for consideration.

Thank you for your attention to this matter.

Sincerely yours,

Buford A. Crites
Mayor

BAC/JW/rgf

cc: Marianne Wetzel, BLM
City Council
City Manager

Timothy Anderson
P.O. Box 497
Desert Center, Ca. 92239
December 16, 1989

Marianne Wetzel BLM
400 S. Farrell Dr. Ste B 205
Palm Springs, Ca. 92262

In Reference BLM CA-25594

Dear Marianne Wetzel,

I am a local farmer in the Desert Center area, and was unable to attend the recent December 6th citizen's scoping session, concerning the proposed landfill site at Eagle Mountain. I am greatly interested in the impact that this landfill could have on the local environment, and my livelihood as an organic farmer. My most alarming concerns are groundwater integrity and the proposed liner that MRC would use to safeguard groundwater. I am also concerned about the use of mined tailings in the cover-up process of the landfill. Could these tailings be composed of some toxic materials and could they leach into our local groundwater ?

I would greatly appreciate that the Environmental Impact Statement would address the concern of tailing use, tailing composure, and any examples of successful use as fill dirt for other landfills in the country. I also request that the Environmental Impact Statement thoroughly investigate the proposed liner, and the history of the successful use of this type of liner in other areas of the country. I feel that this proposed liner should be impregnable to alcohol solvents, and petroleum products such as thinners, cleaners, or paints. At one point MRC announced that the liner was one of new technology and composed of clay. I question the use of new technology in an untested procedure that could have devastating results to our local environment and groundwater. I also know that the history of the clay liners in creating an impregnable barrier against alcohol solvents and some petroleum products is very poor for landfills located in other areas of the country.

For these reasons, I request that the Environmental Impact Statement cites successful uses of this type of liner in other areas of the country. I very much hope that you will embrace these concerns with the same feelings that we, the people who live and work here , do. I make one last request in that I might obtain a copy of the Environmental Impact Report / Statement when it is complete and ready for public scrutiny. Thank you for your time.

Sincerely,

Timothy W Anderson

Timothy W. Anderson

Individuals and Organizations Receiving Document

Individuals and Organizations Receiving Documents

Ron Ackert
Dean Affeldt
Patti & Tom Aiken
Alhambra Community Development
John Amy
Anaheim Community Development
Eugene Anderson
Robert & Ruth Anderson
Timmothy W. Anderson
Dept. of Army - L.A. District
Artesia Planning Department
Sam Atwood
Audubon Society, Coachella Val
Don Moore
Larry LaPre
Los Angeles Audubon Society
Nat'l Audubon Society
Yuma Audubon Society
Azusa Community Development
Amber L. Bailey
Baldwin Park Planning Dept.
Banning Community Development
Banning Unified School Dist.
Beaumont Planning Dept.
Bell Community Development
Bell Gardens Planning Dept.
Betty Benner
Craig Beno
Soc. Conserv. Bighorn Sheep
Ken Bingenheimer
F. L. Blinzler
Anthony Borders
J. Bostwik
Charles G. Boyd
Glen Boylan
Stephanie Brady
Michael Brandman Associates
Brawley Planning Dept.
Brea Development Services
Olaf Brunstad
Buena Park Development
Burbank Community Development
Bureau of Land Management
CA Assn of 4WD Clubs
CA Fed of Mineralogical Societies
CVAG
CA Dept. Fish & Game
California State Clearinghouse
Anastacio Calderon
Air Resources Board
CA Dept Fish & Game
CA Dept. Parks & Recreation
CA Energy Commission
CA Highway Patrol
CA Office of Planning & Research
CA State Dept. of Parks & Rec
CA State Historic Preservation Office
CA State Lands Commission
CA State Resource Agency
Calif State Lands Commission
Calif. Dept. Of Fish & Game
Calif. Dept. of Conservation
Calif. Dept. of Corrections
Calif. Dept. of Food & Agriculture.
Calif. Dept. of Public Health
Calif. Div. of Mines & Geology
Calif. Highway Patrol
Calif. Native Plant Society
Calif. Reclamation Board
Calif. St. Mining & Geology Board
Calif. State Lands Commission
Calif. Waste Management Board
D.J. Everitts
Gordon Duffy
Ms. Elain Russell
Ms. Kathryn Gualtieri
State of California
Water Quality Control Board
Calif. Wilderness Coalition
Calipatria Planning Dept.
CALTRANS
Caltrans - District 11
Caltrans - District 8
Saul & Ismael Cantu
Gladys Capp
James & June Capp
S. Carmichael
Ann Marie Carnata
Chev & Clarissa Carney
Curtis Carney
Carson Community Development
Cathedral City Planning Dept.
Cerritos Environmental Dept.
Donna & Larry Charpied
Chino Community Development
JR Chiriaco
City of Chula Vista Planning
Claremont Planning Dept.
CoCa Mines, Inc.
Coachella Community Dev.
Coachella Valley Water Dist.
Colorado River Board
Colton Community Development
Commerce Planning Dept.
Community Services District
Compton Planning Dept.

Individuals and Organizations Receiving Documents

Johnney Coon
Costa Mesa Development Service
John M. Coudures
Walter Courtenay, Jr.
Covina Community Development
Culver City Planning Dept.
Cypress Community Development
County of Riverside
Martin T. Czerniak
Dr. Kenneth S. Norris
Elden Hughes
Frank Grace
James R. Bagley
Mr. Chuck Bell
Mr. Dave Fisher
Mr. Fred R. Owings
Mr. Glenn Sudmeier
Mr. Richard Milanovich
Mr. Robert T. Filler
Mr. William M. Claypool III
Mrs. Dana F. Bell
Mrs. Patricia Larson
Mrs. Sharon Apfelbaum
Mrs. Susan Hickman
Ms. Mary Ann Fisher
Ms. Mary DeDecker
Clayton Record
Dr. Loren L. Lutz
Ms. Marie H. Brashear
Defenders of Wildlife
Dept Regional Planning
Department of Water & Power
Desert Bighorn Council
Desert Center Unif School Dist
Desert Fisheries Council
Desert Protective Council
Desert Tortoise Council
Desert Tortoise Preserve
Desert Water Agency
Frank E. Dobbs
James Dodson
Downey Community Development
U.S. Environ Protection Agency
Earth First
Ecology Task Force
Economic Development Agency
Bill Edmonds
El Cajon Planning Dept.
El Centro Planning Dept.
El Monte Planning Dept.
El Segundo Planning Dept.
Bob & Beth Erickson
Donald Fife
Fontana Planning Dept.
Beula Edmiston
Fullerton Development Services
Garden Grove Development
Gardena Community Development
General Telephone of Calif.
Ted Giles
Glendale Planning Division
Grand Terrace Planning Dept.
Duane Gray
John T. Gray
Great Basin Foundation
Ms. Green
Mr. & Mrs. Fred Griffin
Janet Harlow
Dorothy Harte
Hawthorne Planning Dept.
Mildred Herrera
Jon Herz
Wade Hobbs
Frank Hoover
Walter Hopkins
Huntington Beach Community Dev
Huntington Park community Dev.
County Board of Supervisors
Imperial County Planning Dept.
Imperial Planning Dept.
Cabazon Reservation
Christine Walker, Chairperson
Daniel Eddie Jr., Chairman
Darryl Mike, Chairman
Dennis Miller, Chairman
Mary Delgado, Chairperson
Mr. Richard Milanovich
Native American Heritage Commission
Nora Garcia, Chairperson
Twentynine Palms Reservation
Mayor Richard Rr. Oliphant
Indio Planning Dept.
Industry Planning Dept.
Dollie Irwin
Irwindale Planning Dept.
Deb James
Lloyd & Joyce Jaramillo
Mr. & Mrs. Jent
Ken Jeske
Carl Johnson
Duane & Carol Johnson
Steve Johnson
Malcolm Jones
Milton Jones
Steve Jones
Richard Jordan
C. Kennady
Jo Kennedy

Individuals and Organizations Receiving Documents

Dallas Kessler
Gurumartra S. Khalsa
Ralph Kingery
Karen & Virgil Kirby
George Knapp
BLM Library
Calif State Library
Coachella Branch Library
Coahella Public Library
Desert Hot Springs Public Library
Indio Branch Library
Lake Tamarisk Br Public Lib
Los Angeles Public Library
Palm Desert Public Library
Palm Springs Library Center
Palo Verde Valley Dist Library
Riverside Central Library
Riverside County/City Library
San Bernardino Co Library
San Bernardino Public Library
UC Riverside Library
La Habra Planning Dept.
La Mesa Planning Dept.
La Mirada Planning Commission
La Puente Planning Dept.
Ron Kiedrowski
La Verne Planning Dept.
County Service Area #51
Cliff & Vivian Lamon
Lancaster Community Dev.
David Lanham
Mr. & Mrs. Cliff Larson
Sgt. Thom Larstead
Dr. June Latting
John Lavender
Paula Lee
Lemon Grove Community Dev.
Ms. Marian R. Livengood
Living Desert Reserve
Dean Lockhart
Loma Linda Community Dev.
Long Beach Planning Dept.
Los Alamitos Community Dev.
L A County Reg. Planning Department.
L.A. Dept. of Water & Power
Los Angeles Planning Dept.
Art Lowe
Lynwood Ccommunity Development
Kaiser Steel Resrouces, Inc.
Metro Water Dist. of So. California
Metropolitian Water Dist.
Mr. Pat Mahoney
Installations Division, NREA
Dave Marlow
Maywood Planning Dept.
J. M. McIntyre
Ina McMichael
Bill Miller
Mine Resources Corporation
Mission Springs Water District
Mr. & Mrs. Moltz
Montclair Community Dev.
Montebello Planning Dept.
Monterey Park Planning Dept.
Mr. Moody
A. L. Morgan
Morongo Basin Conserv Assn
Greg Myer
National City Planning Department.
National Parks & Conserv Assn
National Resources Def Council
National Wildlife Federation
National Park Service
Nancy Nicolai
Norco Community Development
Norwalk Planning & Dev.
Ontario Planning Dept.
Open Resources Committee
County of Orange Planning Department
Orange Community Dev.
Hon. Anthony C. Beilenson (D-23)
Hon. Carlos J. Moorhead (R-22)
Hon. Christopher Cox (R-40)
Hon. Dana Rohrabacher (R-42)
Hon. David Dreier (R-33)
Hon. Edward R. Roybal (D-25)
Hon. Elton Gallegly (R-21)
Hon. Estéban Edward Torres, D-34
Hon. George E. Brown, Jr. (D-36)
Hon. Glenn M. Anderson (D-32)
Hon. Henry Waxman (D-24)
Hon. Howard L. Berman (D-26)
Hon. Julian C. Dixon (D-28)
Hon. Matthew G. Martinez (D-30)
Hon. Maxine Waters (D-29)
Hon. Mel Levine (D-27)
Hon. Mervyn Dymally (D-31)
Hon. Richard Katz (D-39)
Hon. Robert K. Dornan (R-38)
Hon. Ron Packard (R-43)
Hon. William E. Dannemeyer, R-39
Honorable Al McCandless (R-37)
Honorable Alan Cranston
Honorable Jerry Lewis (R-35)
Honorable John F. Seymour
Hon. Alan Robbins (D-20)
Hon. Art Torres (D-24)
Hon. Bill Greene (D-27)

Individuals and Organizations Receiving Documents

Hon. Bill Lancaster (R-62)
Hon. Bill Leonard (R-25)
Hon. Bob Epple (D-63)
Hon. Burt Margolin (D-45)
Hon. Cathie Wright (R-37)
Hon. Cecil Green (D-33)
Hon. Charles Calderon (D-26)
Hon. Curtis R. Tucker, Jr.(D-50)
Hon. Dave Elder (D-57)
Hon. David G. Kelley (R-73)
Hon. David Roberti (D-23)
Hon. Diane E. Watson (D-28)
Hon. Doris Allen (R-71)
Hon. Ed Davis (R-19)
Hon. Edward R. Royce (R-32)
Hon. Frank Hill (R-31)
Hon. Gary K. Hart (D-18)
Hon. Gerald N. Felando (R-51)
Hon. Gil Ferguson (R-70)
Hon. Gwen Moore (D-49)
Hon. Herschel Rosenthal (D-22)
Hon. Jerry Eaves (D-66)
Hon. Jim Brulte (R-65)
Hon. John R. Lewis (R-67)
Hon. Lucille Roybal-Allard (D56)
Hon. Marian Bergeson (R-37)
Hon. Newton R. Russell (R-21)
Hon. Nolan Frizzelle (R-69)
Hon. Pat Nolan (R-41)
Hon. Paul A. Woodruff (R-61)
Hon. Paul Horcher (R-52)
Hon. Paula Boland (R-38)
Hon. Ralph C. Dills (D-30)
Hon. Richard E. Floyd (D-53)
Hon. Richard Katz (D-39)
Hon. Richard L. Mountjoy (R-42)
Hon. Richard Polanco (D-55)
Hon. Robert G. Beverly (R-29)
Hon. Robert Presley (D-36)
Hon. Ross Johnson (R-64)
Hon. Ruben S. Ayala (D-34)
Hon. Sally Tanner (D-60)
Hon. Steve Clute (D-68)
Hon. Teresa Hughes (D-47)
Hon. Terry Friedman (D-43)
Hon. Tom Bane (D-40)
Hon. Tom Hayden (D-44)
Hon. Tom Mays (R-58)
Hon. Tom McClintock (R-36)
Hon. Tom Umberg (D-72)
Hon. Willard H. Murray Jr., D-54
Hon. Xavier Becerra (D-59)
Honorable Robert B. Presley
Honorable Steve Clute

Marguerite Archie-Hudson (D-48)
Drew Pallette
City of Palm Desert
Palm Desert City Planning
Palm Springs Planning Div.
Palmdale Planning Dept.
Paramount Community Dev.
Reverend Dean E. Parker
Mr. & Mrs. Patterson
Mr. & Mrs. Perez
Perris Planning & Comm. Dev.
Gordon Peterson
Mrs. Shirley Pettis
Pico Rivera Planning Agency
Mr. & Mrs. J.R. Pills
Dave Pinson
Marvin Plennert
Marilyn Pletz
Pomona Planning Division
Public Utilities Commission
Division of Public Works
Wayne Quimby
David Ragsdale
Jeff Ragsdale
Sidney Ragsdale
Stanley E. Ragsdale
Rancho Cucamonga Community
Development
Rancho Mirage Community
Development
Allen & Maria E. Reames
RECON
Redlands Planning & Dev.
Redondo Beach Community
Development.
Clyde Reed
Larry & Kathy Reed
Reg. Water Quality Control #8
Reg. Water Quality Control #9
R. Reistroffer
Richard L. Reynolds
Rialto Planning Dept.
Carol Byers
Eileen Dalton
Laurie Holk
Riverside City Planning Dept.
Riverside County Fire Dept.
Riverside County Fire Dept.
Riverside County Flood Control
Riverside County Health Dept.
Riverside County Parks Dept.
Riverside County Sheriff's Dept.
Riverside Press Enterprise
Riverside Press-Enterprise

Individuals and Organizations Receiving Documents

Jim Root
Rosemead Planning Dept.
Trigg R. Rourke
Glenn Rouse
Albert & Dorothy Rowe
SANBAG
SCA Turtle & Tortoise Club
Ron Salz
Steven L. Samanihgo
County of San Bernardino
Ina A. Petokas
San Bernardino City Planning
San Bernardino County Museum
Sharon Hightower
SANDAG
San Diego County Planning Department
San Diego Planning Dept.
San Dimas Community Dev.
San Fernando Planning dept.
San Gabriel Planning Dept.
San Jacinto Community Dev.
L. D. Sanders
Santa Ana Planning Dept.
Santa Clarita Community Development.
Santa Fe Springs Planning
Santa Monica Planning Div
William Savage
Dwight Sawyer
A. L. Scarpinato
Dr Jerald Scherba
Myrtle Shannan
Bill Havert
Ann Dennis
Debbie Sease
Sierra Club Legal Defense Fund
Signal Hill Planning
Ron Sikorsi
Lorraine Silvey
Paul & Vernessa Skates
So. Calif. Assoc. of Govt's
South Coast AQMD
South Gate Planning Dept.
Southern Calif Edison
Southern California Gas
Southern Pacific Railroad
E.O. Spencer
Vera Stanley
Stanton Planning Division
Ken Statler
Glenn R. Stewart, Ph.D.
Dale A. Stirling
Jerry Stokes
James Strain
Temple City Planning Dept.

Tetra Tech, Inc.
John Tiffe
Marie Tirpak
Mr. & Mrs. Tisdel
Carolyn Toenjes
Torrance Planning Dept.
Betsy Truax
Mickey & Will Truitt
Tustin Planning Commission
Chamber of Commerce
UCR Archaeological Research
University of California
Jim Myrtetus
U.S. Dept of Army, L.A. District.
James Arnold
USDA Soil Conservation Service
Bureau of Mines, DOI
Bureau of Reclamation
Dept. Of Interior
Office of Environmental Compliance
Environmental Division
Office of Environmental Policy
U.S.D.I
U.S. Fish & Wildlife Service
US Fish & Wildlife Service
Forest Supervisor
US Geological Survey
National Park Service
Jackie Underwood
Upland Planning Dept.
Audrey Van Matre
Dannia Vann
Kim Vann
Vernon Community Services
Roly Very
Villa Park City Council
Walnut Planning Dept.
Waste Management
West Covina Planning Dept.
Westminster Community Dev.
Whittier Planning Dept.
The Wilderness Society
Wildlife Management Inst.
Wildlife Society
Marilyn Williams
Mr. & Mrs. Williams
E.M. Wood
Terry Wood
Mary E. Zeiler

APPENDIX B

PROJECT DESCRIPTION

CONTENTS

PROJECT DESCRIPTION

INTRODUCTION

This specific plan (No. 252) is for the Eagle Mountain Solid Waste Management Project, a regional waste-by-rail project to bring solid waste generated in Southern California to a landfill in Eastern Riverside County. As part of this project, the applicant proposes to reclaim a portion of the former Eagle Mountain open pit iron ore mine for the land disposal of nonhazardous municipal solid waste generated in Southern California and to provide retrievable storage of recyclables salvaged from municipal wastes.

Refuse delivered to the landfill will be processed through processing and transfer stations located as near as practicable to the sources of refuse generation in the metropolitan Southern California area. At these stations, refuse will be screened for unacceptable substances, sorted for recyclables, compacted, and loaded into intermodal shipping containers or conventional transfer trailers. Intermodal containers will be loaded either on rail cars for direct transport to the project site by rail, on trucks for transport to a rail head for subsequent transport to the project site by rail or for direct transport to the landfill by highway.

The proposed landfill will result in the reclamation of a portion of the former Eagle Mountain open pit iron ore mine. For site access, the project will utilize (1) Kaiser's 52-mile industrial railroad connecting the mine with the Southern Pacific main line at Ferrum Junction, California, and (2) Kaiser's 5-mile road, connecting the mine with Interstate 10 via the Eagle Mountain Road.

The project site will be designed for a maximum of 20,000 tons per day (tpd) of refuse (up to 16,000 tons per day by rail and up to 4,000 tpd by truck). The estimated capacity of the proposed landfill is in excess of 730,000,000 tons, and its minimum life is estimated to be approximately 115 years. The daily capacity of the proposed operation, 20,000 tpd, represents approximately one-fourth of the solid waste disposal needs of the Southern California area.

PROJECT OWNER AND OPERATOR

Mine Reclamation Corporation (MRC) has leased approximately 8,300 acres of the former Eagle Mountain mine and the 52-mile Kaiser railroad right-of-way from Kaiser Steel Resources, Inc. (Kaiser) for a period of 100 years. A major portion of this leasehold is being proposed for development as described herein. MRC also intends to operate the private rail line between Ferrum Junction and the landfill. The applicant may also develop and operate transfer stations in urban areas, or utilize existing or proposed transfer stations developed by other companies.

PROJECT LOCATION AND SIZE

The project site is a portion of the Eagle Mountain iron ore mine located in the Eagle Mountains in the desert area of eastern Riverside County (see Figure 1). The site is located approximately 10 miles north of Desert Center (see Figure 2), about 200 miles east of Los Angeles, and approximately 50 miles west of the Arizona border. The site occupies approximately 4,695 acres. The landfill itself will overlie about 2,272 acres.

The site is bordered on the north by the Pinto Basin, on the east by the Chuckwalla Valley, on the South by the Chuckwalla Mountains, and on the west by the Eagle Mountains. The northern boundary of the proposed landfill is approximately 8,000 feet from the Joshua Tree National Monument at its closest point. Site boundaries are shown in Figure 3.

The town of Eagle Mountain, built by the Kaiser Steel Corporation for the employees, is adjacent to the mine. The town is presently occupied by Kaiser office facilities, a low-security "return-to-custody" detention facility, and approximately 65 occupied dwelling units utilized by the employees of the detention facilities; an additional 25 units are scheduled to be leased by May 1, 1991. The nearest town is Lake Tamarisk, located approximately 8 miles

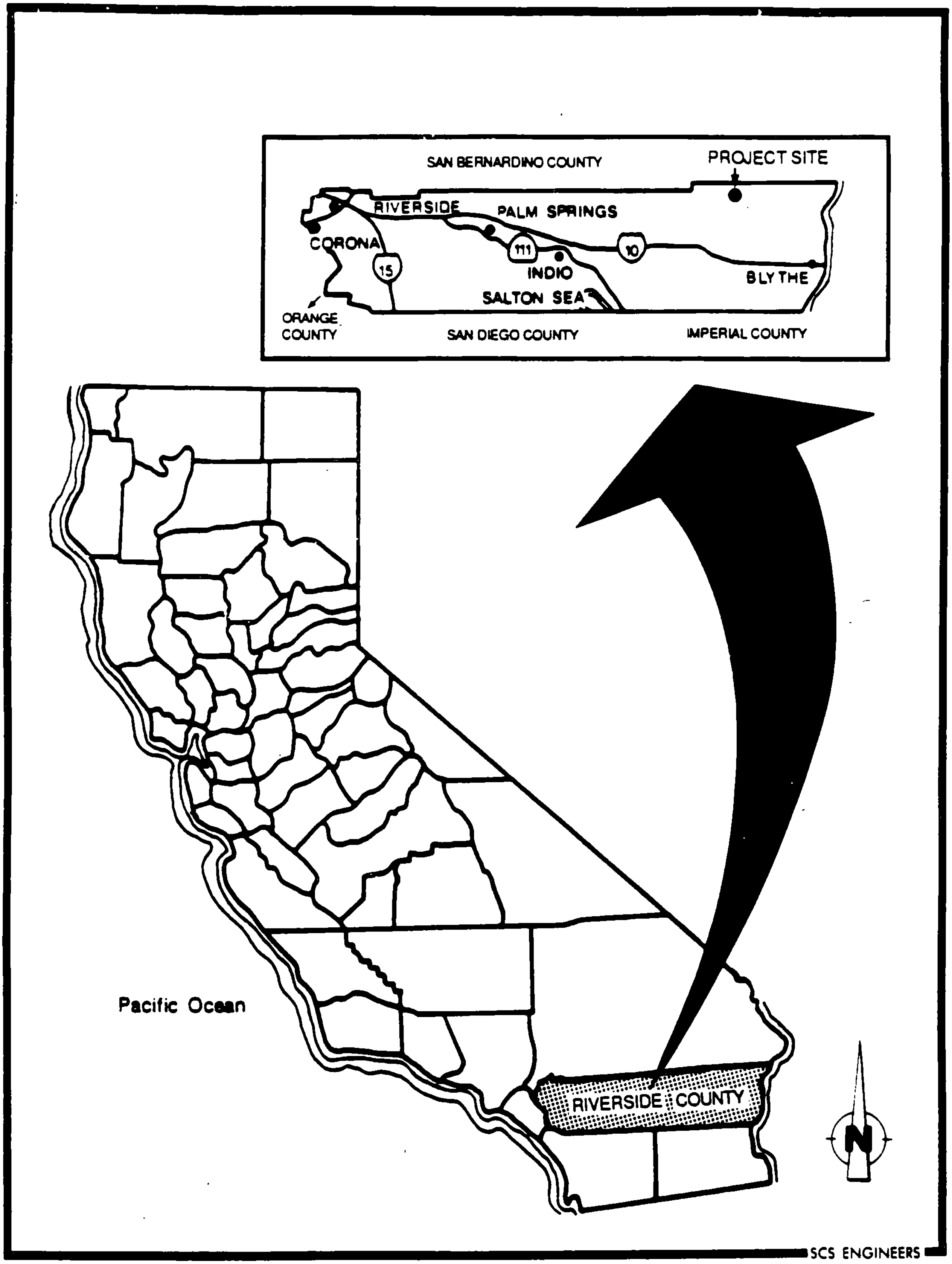


Figure 1. Location Map.

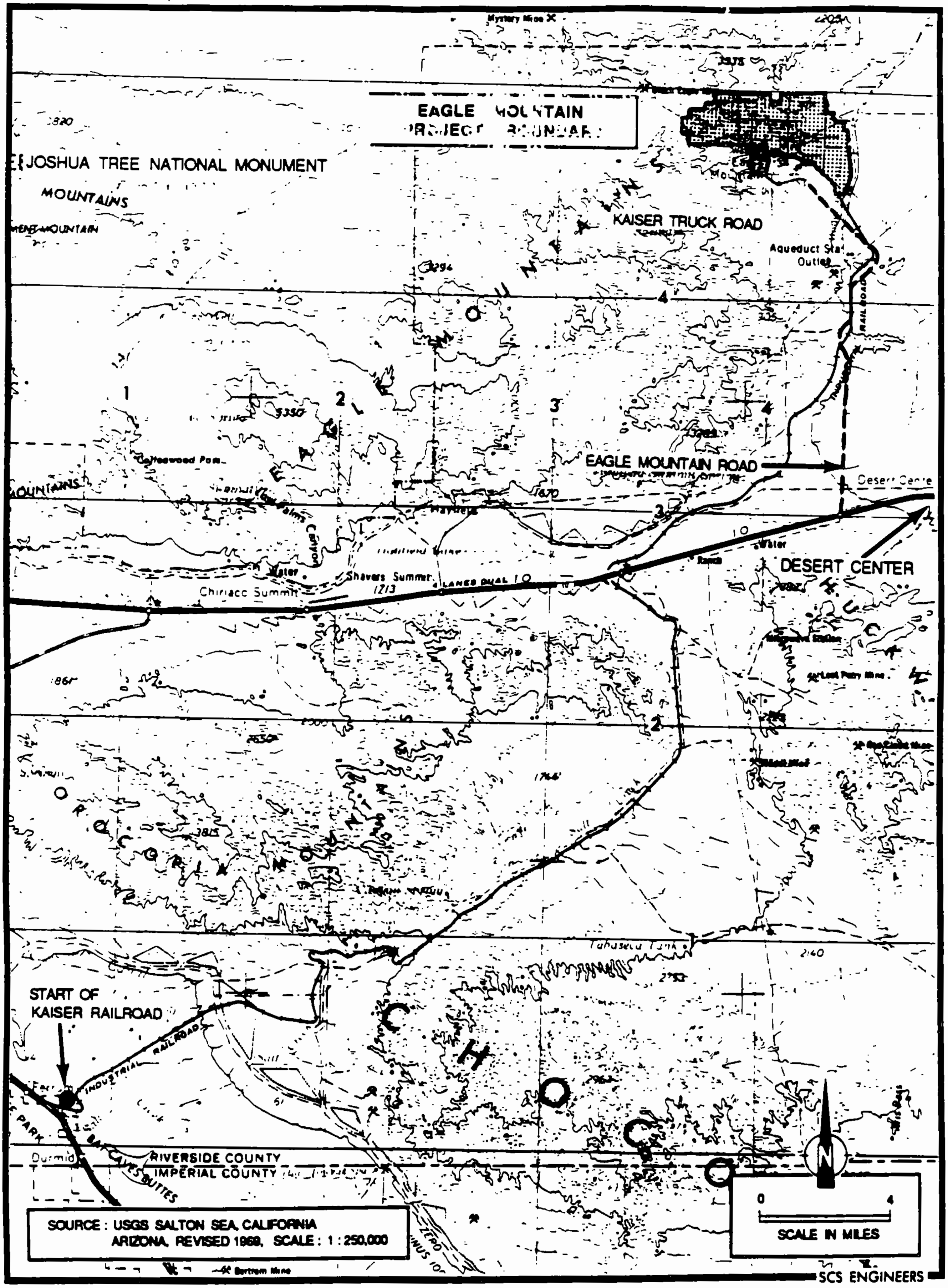


Figure 2. Area Map, Eagle Mountain Project, Riverside, California.

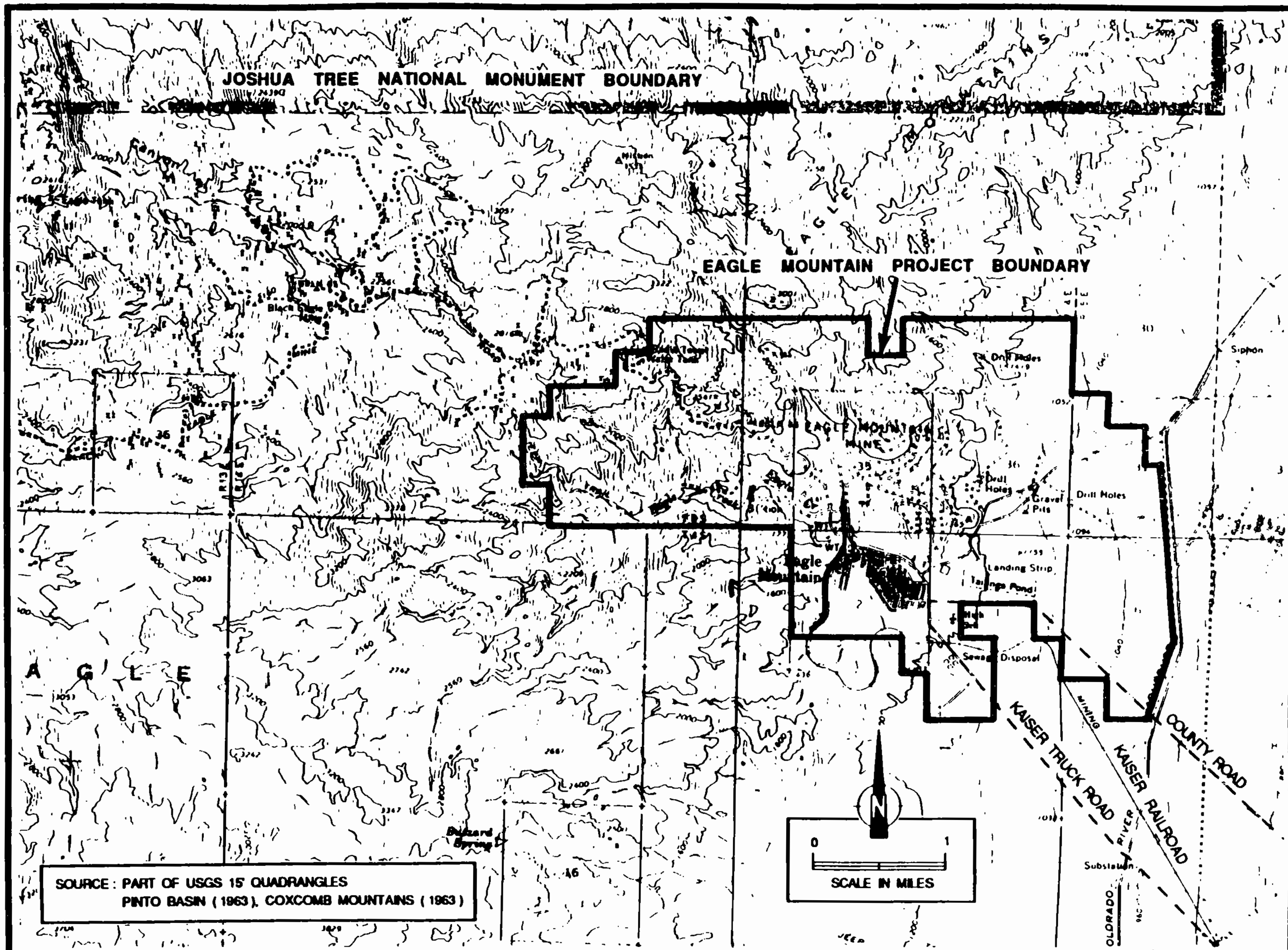


Figure 3. Eagle Mountain Project Boundary.

south of the mine and originally built by Kaiser Steel for mine management personnel.

PROJECT OBJECTIVES

The project is being implemented with the following objectives:

- To provide facilities to support the recycling and disposal of nonhazardous municipal solid waste generated throughout Southern California.

- In view of anticipated shortfalls in solid waste disposal capacity, to provide capacity adequate to accommodate a significant portion of anticipated future demand in Riverside, San Bernardino, Los Angeles, and Orange Counties.

- To make every effort to ensure that waste received at the landfill will first be processed through materials recovery facilities where hazardous materials will be removed and recyclable wastes will be recovered.

- To operate all facilities in accordance with applicable rules, regulatory requirements, and plans and policies of local, regional, state, and federal agencies.

- To operate the project in a manner which mitigates potential adverse environmental effects and minimizes impacts on adjacent and nearby land uses.

- To receive a fair financial return on the investment required to develop and operate the project.

PROJECT DESIGN COMPONENTS

Project Capacity and Waste Stream

Project phasing and sequencing is discussed in Section IV.B.5 of the specific plan. The estimated capacity of the project site (i.e., the East Pit area) is in excess of 730,000,000 tons. With a maximum inflow of 20,000 tons per day, this site has adequate capacity to accept refuse for more than 115 years. The market area served by the project includes Los Angeles, Orange, San Diego, Riverside, San Bernardino, Ventura, and Kern Counties. Eventually, the project may also accept waste generated in other locations (e.g., North San Diego County). Within this market area, the EIS/EIR assesses impacts related to what is considered the most likely scenario for waste management with waste generation by transport mode as shown in Table 1.

TABLE 1. WASTE GENERATION AND TRANSPORT MODE
(Tons Per Day)

Location	By Rail	By Truck
City of Los Angeles	5,000	0
San Gabriel Valley	7,000	0
San Bernardino County	2,000	2,000
North Orange County	2,000	0
Riverside County	0	2,000
Total	16,000	4,000

The project site will be designed to manage nonhazardous solid waste from residential and commercial sources including single and multiple family residential units, office buildings, retail stores, wholesale businesses, manufacturing, and construction activities. Typically waste from these sources includes paper, plastic, food waste, metal, glass, fabric, and yard waste. It also includes non-water-soluble, nondecomposable inert solids such as concrete, rock and fill, and other construction and demolition materials. The applicant proposes to operate the landfill to accept all wastes eligible for disposal at Class III nonhazardous sanitary landfills.

The landfill will <u>not</u> accept the following substances:

- Liquid wastes.
- Hazardous wastes.
- Sewage sludge.
- Incineration ash.
- Radioactive wastes.
- Biological wastes.
- Infectious wastes.
- Other special solid wastes.

Project Phasing

Two types of phasing will occur in conjunction with the project. First, the use of container handling facilities will be phased as follows. The first phase will be designed to accommodate an inflow equivalent of up to one train per day (3,500 tpd refuse) and up to 50 trucks per day (1,250 tpd). In this phase of the project, waste will be received in a container handling area at the terminus of the existing Kaiser rail line, northwest of the town site. Waste received by rail will be delivered via the existing rail line from Ferrum Junction. During the initial phase, waste received by truck will access the site via the new truck road and an on-site haul road.

During Phase II, at an inflow of over 4,750 tpd, waste will be received via the new truck road used in Phase I and a new rail right-of-way which will run parallel to the new truck road. During this phase, waste will be off-loaded in newly constructed container handling facilities in the eastern portion of the project area and in the area northwest of the town site.

Waste Processing and Transfer Stations

The other type of landfill phasing is related to the sequence of landfill activities planned for the project site. Landfill sequencing is divided into four phases as described and shown in Section IV.B.5 of the specific plan.

Refuse delivered to the landfill site will first be passed through processing and transfer stations. The exact locations of these stations are not known at the present time; they will, however, be located as near as practicable to the sources of refuse production, and will have railroad access at the site or relatively nearby.

Processing and transfer stations will function as recycling, screening, and transfer facilities, Namely, incoming refuse will:

- Be screened for unacceptable wastes (hazardous and radioactive materials) which will be removed.

- Have recyclables recovered.

- Be compacted into containers and loaded for transport to the project site as follows:

  - Onto rail cars for direct transport by rail.

  - Onto trucks for transport to a rail head and subsequent loading for transport by rail.

  - Onto trucks for direct transport by highway.

  - Onto conventional transfer trailers for direct transport by highway.

The specific location, size, and number of the facilities needed for this purpose will be tailored to the needs of the area served, and is likely to include a mix of sites on or near rail lines. Existing waste transfer sites will be used wherever possible.

The primary purpose of the processing and transfer facilities, separate from their potential function as recycling centers, is to provide the project with specific control over the type and volume of waste disposed at the Eagle Mountain landfill.

Sorting, screening, and processing of wastes and recyclables will be performed within enclosed structures. Because the ownership and management of these facilities have not been determined, it is anticipated that a combination of mechanical and hand-sorting methods will be used to recover recyclables. It is intended that the waste will be sorted to remove metals, wood, cardboard, paper, glass, plastic, and yard waste. Loads of recyclables will be sorted in a separate area and accumulated with the materials recovered from the waste loads. The accumulated recyclables will be loaded into shipping containers for delivery to recyclers or, depending on market conditions, storage at Eagle Mountain. Nonrecoverable materials will be compacted and loaded into containers for transport to the disposal site.

Co-Location with Recycling Centers--

Depending on the location and ownership of the processing and transfer stations, it may be possible to use these stations as recycling centers, to designate one or more of these facilities as recycling centers, or to gradually add recycling functions after a site has been developed as a transfer station. Note that whether or not recovered materials are actually sold at these facilities (or elsewhere), recyclable goods will be removed from the waste to be disposed at Eagle Mountain.

Container Loading/Compaction--

The closed containers proposed for the transport of refuse to the project site by both rail and highway will have an approximate volume of 95 cubic yards (typically 40 feet in length, 8 feet in width, and 8 feet in height). These containers will be similar in appearance to the intermodal containers currently in use for shipping goods by ship, rail, and truck. The containers will be loaded in accordance with applicable weight limits for rail cars and highway vehicles. Accordingly, the containers will be loaded (charged) at the transfer stations with precompacted and weighed refuse to ensure that each container has a payload below the legal maximum weight.

Container loading at rail transfer stations will be accomplished with a stationary compactor which precompacts refuse into a receiving container where the refuse is weighed as it is being compacted. After the predetermined amount of refuse has been compacted, it will be hydraulically transferred to a receiving container for transport to the project site. The type of compactor to be used at this facilities can compact, weigh, and load 25 tons of refuse into receiving containers at 10-minute intervals.

Each rail transfer station will have a supply of containers which will exceed the number required for normal operations by at least 10 percent. This excess supply will provide container storage for waste awaiting transport, and will allow container loading to continue in the event that a train with empty containers is not received on schedule. Each rail car will have sufficient surge capacity to permit the loading of full containers and their temporary storage. Container loading at these transfer stations will utilize equipment similar to the equipment used to handle containers at the project site. This equipment will consist of rubber-tired container handlers and/or overhead cranes.

Waste Transport

At the maximum inflow, transport of municipal solid waste to the project site will be accomplished by both rail (up to 16,000 tons per day) and truck (up to 4,000 tons per day). Potential routes for rail haul of refuse to the project site are shown in Figure 4. Rail transport of containerized waste will accomplished by unit trains, which will be delivered to the switching yard at Ferrum Junction, California, over the existing Southern Pacific mainline, utilizing locomotive power provided by Southern Pacific. From the Ferrum Junction siding, unit trains will be moved to the landfill site over the existing private railroad line. From Ferrum Junction to the site, unit trains will be powered by MRC, Southern Pacific, or other privately owned locomotives. At maximum, six trains will be operated per day. Empty unit trains returned from the landfill will be picked up from the Ferrum Junction siding by Southern Pacific for return to the rail transfer stations.

Presently, Kaiser's rail line connects Ferrum Junction with Eagle Mountain mine. In conjunction with the project, a new rail spur will be built, taking off from the Kaiser Rail line at a point southeasterly of the existing landing strip and terminating in the container handling yard. The new spur will be

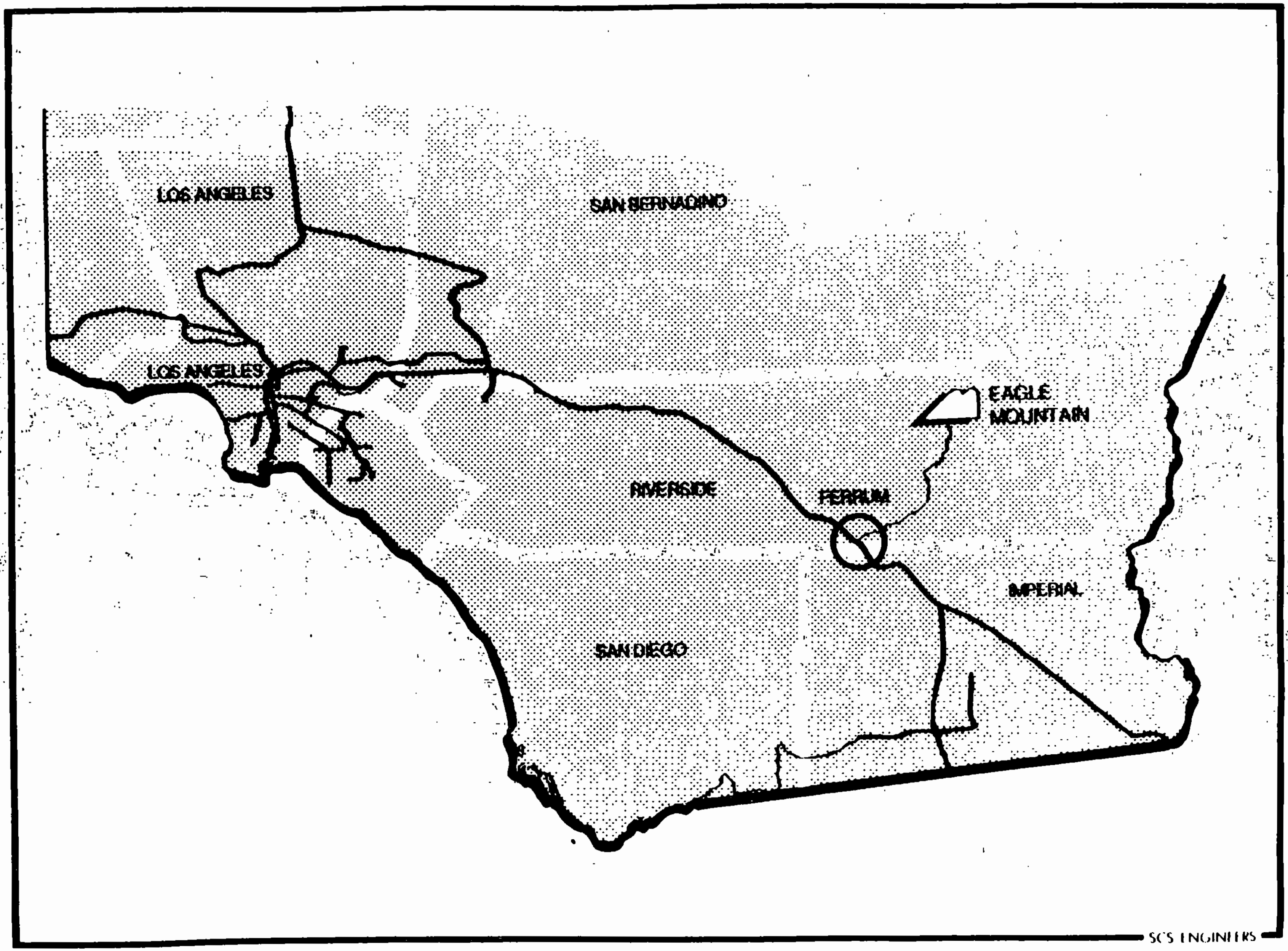


Figure 4. Potential Rail Haul Routes for the Eagle Mountain Project.

approximately 2 miles long and will carry rail traffic to the eastern portion of the project site and away from the town of Eagle Mountain.

Highway access will be provided via Interstate Highway 10, the Eagle Mountain Road (County Road R2), and the proposed Eagle Mountain Road Extension. Eagle Mountain Road runs north from its intersection with I-10 (approximately 2 miles west of Desert Center) to the Colorado River Aqueduct Eagle Mountain Pumping Plant. This road will be widened and improved to meet the design standards of the County of Riverside regarding drainage, culverts, paving material, thickness, etc.

For this project, the Eagle Mountain Raod Extension will be used to access the landfill from the northern terminus of the Eagle Mountain Road. The extension will begin from just south of the Metropolitan Water District Pumping Station along the alignment of the old Kaiser Truck Road and will continue in a northerly direction into the container handling facility at the eastern edge of the landfill. The location of the realigned rail spur and truck road are shown in Figure 5. The facility will also be constructed in accordance with County standards.

Unit Trains--

Unit trains will consist of one or more diesel locomotives carrying 14 articulating "twin stack" rail cars (see Figure 6). Each car will be approximately 256 feet long and will consist of five articulating units, each with a well-type configuration capable of holding two stacked 40-foot by 8-foot by 8-foot containers. Each car will carry 10 containers.

Each train will be less than 4,000 feet long and carry approximately 3,500 tons of refuse. This train length is somewhat shorter than most main line trains but approximately the same length as the Kaiser unit trains which used to carry ore from the Eagle Mountain mine. However, because of the relative density of refuse compared with ore, the weight of the refuse trains will be less than 35 percent of the weight of the Kaiser ore trains.

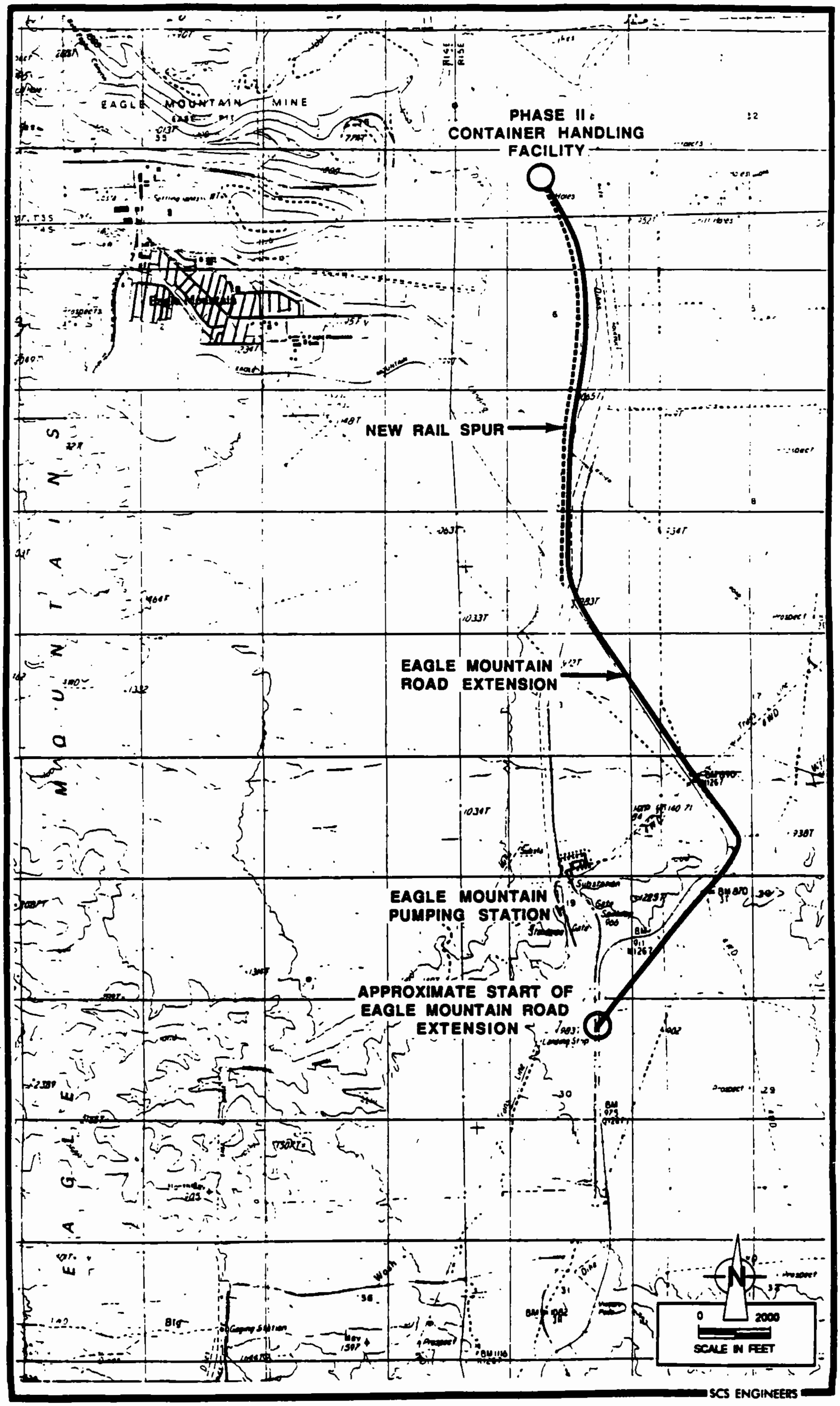
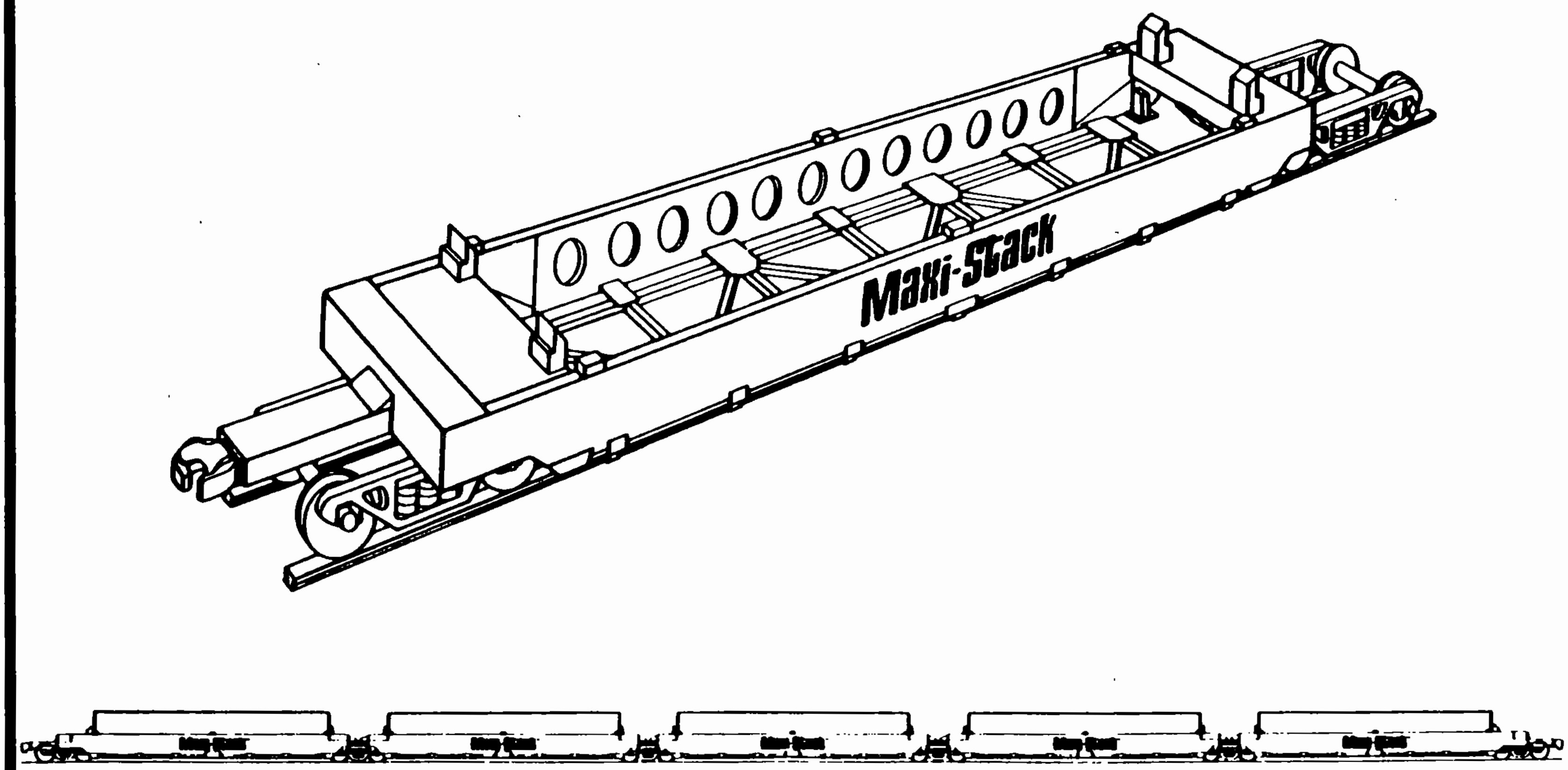


Figure 5. Preliminary Right-of-Way Alignment for Eagle Mountain Road Extension and Rail Spur.

Double-Stacked Articulating Rail Car



SCS ENGINEERS

Figure 6. Double-Stacked Articulating Rail Car.

ALLOWABLE BRIDGE	80,000	FRONT AXLE WEIGHT	12,000
TRACTOR WEIGHT	13,000	TRUCK TANDEM WEIGHT	34,000
TRAILER WEIGHT	13,900	TRAILER TANDEM WEIGHT	34,000
BOX WEIGHT	1,500	GROSS WEIGHT	80,000
PAYLOAD	50,100		

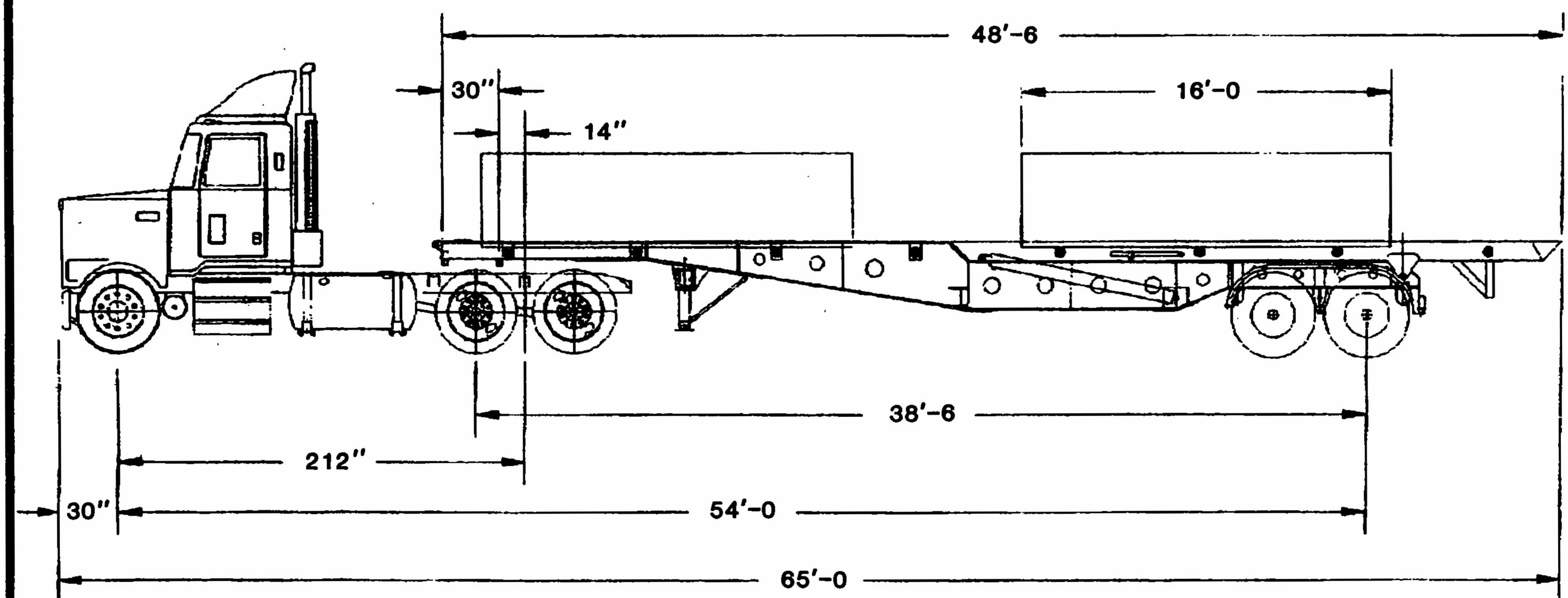


FIGURE 6a. CONTAINER HANDLING VEHICLE

Locomotive power from the loading stations to Ferrum Junction will be provided by the Southern Pacific Railroad (primary carrier). Initially, there will be five diesel electric locomotives available to power the trains between Ferrum Junction and the proposed landfill site. All locomotives will be equipped with diesel-powered engines generating approximately 3,000 HP. The locomotives will be reconditioned and upgraded to reduce emissions prior to the start of the project.

Trucks--

Two hundred daily two-way truck trips will be required to deliver the 4,000 tons per day of refuse by truck to the project site. If the loads were delivered at an even rate over 24 hours, seven loads would be delivered each hour. If the transfer vehicles were scheduled to arrive only during daylight hours, approximately 16 vehicles would arrive on an hourly basis. Although the placement of wastes in the landfill will be restricted to daylight hours, the container handling yard will be used to receive and store containers from trucks and unit trains on a 24-hour basis. Loaded intermodal containers will be off-loaded and empty containers on-loaded during evening hours. Waste delivered in conventional transfer trailers will be accepted during daylight hours.

For truck transport, refuse will be placed either in containers identical to those used for rail transport or in conventional highway transport vehicles. Containerized waste will be transported either by three-axle truck tractors and two-axle semitrailers which typically have the following characteristics: (1) diesel engines with a maximum rating of 350 HP, (2) a payload of approximately 25 tons, and (3) total loaded weight of less than 80,000 pounds.

These transfer vehicles will deliver containerized refuse directly to the container handling yard. Loaded containers will be replaced with empty containers for the return trip. Loaded transfer vehicles will generally be dispatched as they are loaded. However, they will not be dispatched during peak traffic hours.

Container Handling Yards

During the first phase of the project, the container handling yard will be located at the terminus of the existing Kaiser rail line. Up to one train per day will enter and exit using the existing track and siding. In this area, waste will be removed from rail cars with rubber-tired container handlers or mobile overhead cranes that will transfer the containers to trailers. The waste will then be transported by trailer to the working face of the landfill.

During the second phase of the project, both the initial container handling area and the larger container handling yard located approximately 0.5 mile from the eastern border of the landfill will be used. The area at the eastern border will contain the following:

- Railroad spur lines or sidings. Each siding will be long enough to allow an entire unit train to be spotted without uncoupling cars, and locomotives to couple and uncouple at either end of the unit trains.

- Equipment for moving containers between the unit trains and the container handling vehicles.

- Equipment for moving containers between the highway transport vehicles and container handling vehicles.

The final layout of the container handling yard for the second phase of the project has not been determined. Two possible configurations, which vary in terms of how containers are transported from the container handling yard to the working face of the landfill, are being evaluated.

With the first configuration, the railroad spur lines will be arranged in groups of two on approximately 62-foot centers. This will allow the loaders to (1) directly off-load containers from the rail cars and load them to container handling vehicles by moving in a direction which is basically at a right angle with the trains; and (2) off-load empty containers from the container handling vehicles and load the empty containers onto the rail cars in the same manner. In this configuration, empty containers will be unloaded from the container handling vehicle and onto a railroad car by one loader; full containers will be unloaded from the railroad car onto the vehicle by another loader.

With the second configuration, the tracks will be grouped as close as possible to each other in groups of two, three, or even four sets of tracks. The number of tracks in each grouping will be a function of size (reach) of a mobile overhead crane used to handle the containers. The clear distance between the railroad cars on adjoining groups of tracks will be approximately 60 feet.

Under either configuration, the length of the unloading area will be sufficient to accept an entire unit train which is approximately 3,700 feet in length. Additional space will be provided at each end to allow the locomotive(s) to uncouple from one train and then move to another spur in order to couple to cars on that track. Given these requirements, the length of the container handling yard will be approximately 4,000 feet.

Rail transport of an average of 16,000 tons of refuse per day could result in up to six trains per day. A minimum of six spur tracks are needed to accommodate this number of trains. To store additional unit trains for longer periods (e.g., for repair), eight spur tracks may be utilized on a daily basis.

Container handling yard operations will be conducted on a 24-hour basis. Lighting will be of the area type. All lights will be directed at the ground to minimize stray lighting. Light intensity will be adequate to allow normal operations to be conducted in a safe manner.

Internal Haul Roads

Both permanent and temporary haul roads will be constructed to transport containers from the container handling yard to the working face of the landfill.

The road from the container handling yard to the refuse fill area will be a permanent road. The road will divide approximately 1 mile from the container handling yard. One branch will extend along and ultimately cross the final fill face on the northern side of the refuse fill; the other branch will be located on the southern side of the fill. These permanent roads will end in temporary haul roads, which will continue to the working face of the landfill and other operating areas. Permanent haul roads will have a minimum improved width of 100 feet with an all-weather surface having a maximum adverse grade of 7 percent. Temporary haul roads will be well graded and hard-surfaced, with a maximum grade appropriate for the vehicles selected. These roads will be extended as final grades are reached.

Road surfacing will consist of either asphalt or compacted and graded rock. Dust will be controlled by regular watering of all traveled roadways which are not paved with asphalt. If the use of dust retardants is necessary to control dust on unpaved roads and within operating areas of the landfill, such action will be subject to approval by the Riverside County Department of Health.

Landfill Design Features

Proposed Sequence of Landfill Operations--

Landfill operations are proposed in four general phases:

1. Landfill operations will be initiated in the southwest portion of Planning Area 1 to an elevation of 1,950 feet MSL. After a series of drainage improvements have been made, landfill activities will be initiated in the westernmost portion of the East Pit.

2. During the second phase, landfilling will continue from the west end of the East Pit to the west end of the landfill to final elevations.

3. During the third phase, the northeastern portion of the landfill will be filled to its final elevation.

4. Finally, the eastern portion of the East Pit will be constructed to its final elevation.

This fill sequence is shown in a series of figures in the Phasing section (IV-8 through IV-11) of this Specific Plan. This fill sequence could enable mining of known iron ore reserves to occur in the eastern portion of the East Pit simultaneously with landfill operations. Since mining operations for this area have not been defined, the environmental impacts of this operation will be assessed in subsequent environmental documents before these operations are initiated.

The phasing plan also limits the disposal of refuse over the deepest depression in the pit to the last phase of the project. Because of uncertainties regarding the presence of ground water in this location, landfill development will not be initiated in this area until it is determined whether ground water is present and/or mitigation measures are necessary to ensure that landfill operations in this portion of the site can proceed without adversely affecting ground water quality. For example, filling this portion of the pit to create a substantial separation between landfill operations and the historic high ground water elevation is proposed by the applicant as a mitigation measure that may be necessary if tests indicate that ground water is present.

As shown in Figure 7, the landfill will reach a peak elevation of 2,700 feet above sea level, after settlement, in the western portion of the disposal area. Figure 7 shows the proposed final contours of the landfill, after settlement, throughout the project area.

<u>Leachate Control and Removal System</u>

Leachate is liquid (e.g., rainfall) that passes through or comes into contact with wastes, or is produced by the decomposition of solid wastes. The system to be used to collect and control leachate at the project site consists of the liner, ground water monitoring wells, and leachate collection, storage, and treatment facilities.

Liner--

The liner is the element of the landfill's leachate control and removal system that serves to direct leachate to the leachate collectors described below.

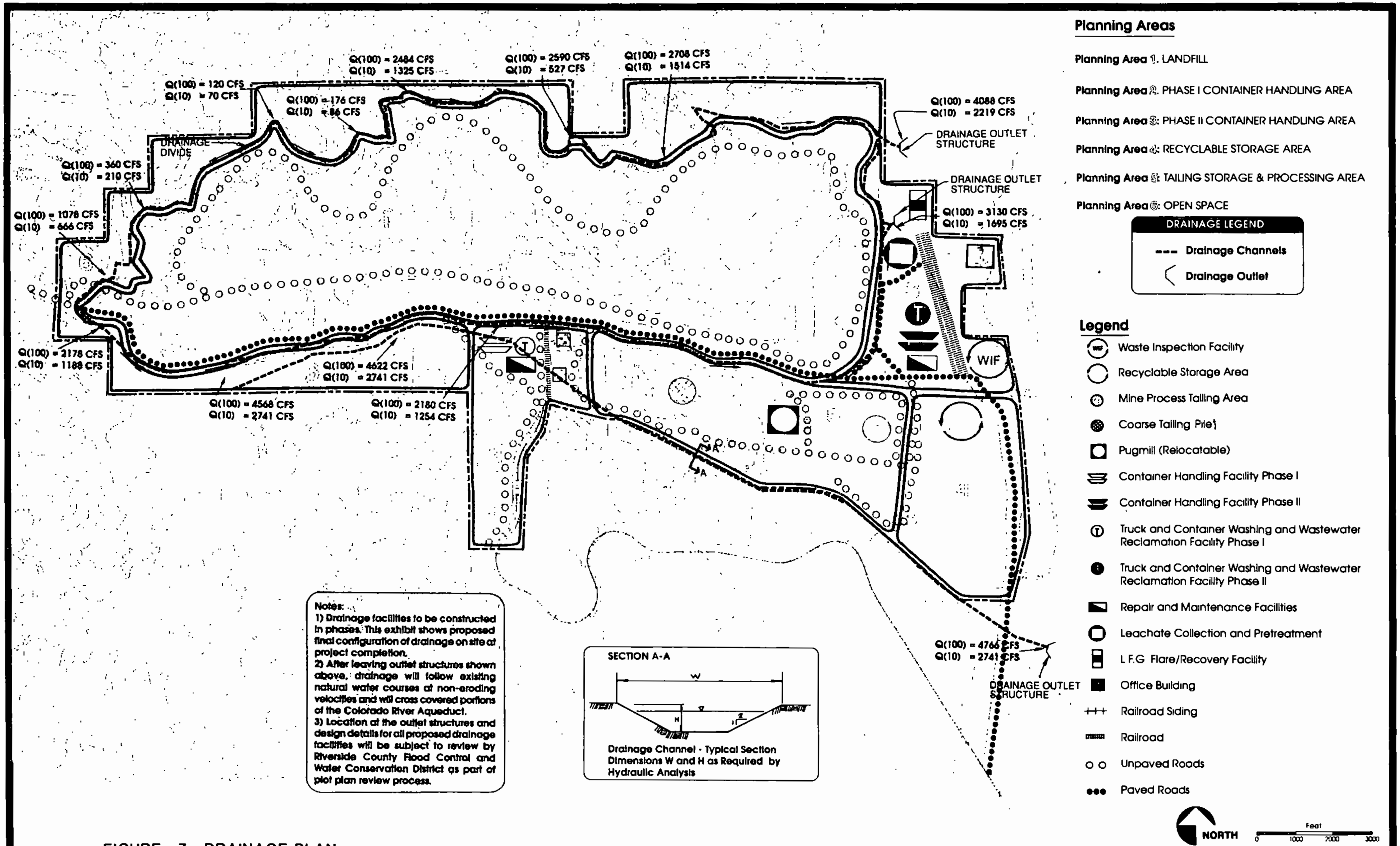


FIGURE 7. DRAINAGE PLAN

SOURCE: THE PRA GROUP, INC., 1991

The entire area underlying refuse (floor and side slopes) will be lined using the large reserve of low-permeability clay-like material (fine tailing) from previous ore mining operations at the site and using a composite/synthetic liner where required to meet regulatory requirements. In accordance with State guidelines, the clay liner will be a minimum 1 foot thick with a permeability of less than 1×10^6 centimeters per second, compacted to 90 percent maximum relative density.

Ground Water Monitoring Wells--

Baseline ground water monitoring conducted in accordance with the requirements of the Colorado River Regional Water Quality Control Board (RWQCB) was completed in March 1990. Monitoring consisted of four quarterly tests at four wells with analysis conducted for general minerals, organic carbon, total organic halides, chemical oxygen demand, ammonia, cyanide, nitrates, heavy metals, and volatile organic compounds. During and after landfill operations, ground water monitoring will continue at these and other wells. It is expected that the Waste Discharge Requirements (WDRs) of the RWQCB will contain modifications to the background water quality monitoring program.

Leachate Collection--

Two leachate collection systems will be used at the site. In the western and northeastern portions of the landfill area, any leachate generated will be directed by gravity over the top surface of the impermeable liner to a series of lateral pipelines located below the refuse. The laterals will connect to a series of trunk lines which will convey this liquid to an on-site wastewater pretreatment plant. Effluent from the pretreatment plant will be transported to the existing Kaiser wastewater treatment plant at the southeast corner of the town of Eagle Mountain. For the East Pit area, collectors will be placed on the bottom of the pit to convey leachate to collection sumps in low areas above the liner. From these sumps, potential leachate will be pumped to the surface and thence via trunk lines to the proposed pretreatment plant.

Leachate Treatment--

Two options are being considered for the treatment of leachate:

1. Leachate, if generated, will be pretreated on site using a package treatment plant designed to lower biological oxygen demand (BOD) and volatile organics to levels where the effluent can be treated at the existing Kaiser wastewater treatment facility. Depending on the volume pretreated at the package plant, the effluent will either be piped or trucked to the Kaiser treatment facility.

2. Alternatively, pretreatment facilities will be added at the existing Kaiser facility.

Drainage System--

The surface water drainage system will be designed with four objectives:

1. Convey storm water flows around and away from the refuse fill.
2. Collect and remove storm water that falls directly on the refuse fill.
3. Control off-site flow of waterborne debris.
4. Minimize erosion.

All on-site drains and drainage structures will be designed to accommodate a 100-year storm (i.e., a storm of such intensity that it is expected to occur only once in 100 years). All storm water flows will be released into existing and naturally occurring surface drainage channels. Channels used to convey storm water around the refuse fill will consist of lined and unlined channels, pipe, and open conduits.

The permanent drainage system for the diversion of storm water from the refuse fill area will be constructed in stages to protect areas of the refuse fill that have reached final elevations. Elements of the system to be constructed initially include a drainage system for the container handling area, permanent drains near the eastern extent of the the refuse disposal area and on-site settling basins, and a series of downdrains placed at 500-foot intervals. The temporary drainage system will consist of a series of intersecting channels and settling/detention basins of the refuse fill. These features will be replaced as the refuse operations continue to final elevations.

The drainage plan for the site will emphasize the use of perimeter drains and an improved system through the town. The southern toe of the landfill will be outside of and above the 100-year floodplain limits. Openings will be constructed at the two blocked sections of Eagle Creek: one at the mouth of the main confluence, and one at the creek neck just downstream of the main confluence.

The northern perimeter drain will be an unlined open trapezoidal channel which collects flows from the landfill surface and the northern canyons tributary to the landfill toe. The southern perimeter drain will also be an unlined open trapezoidal channel which will collect flows from the landfill surface only. Both drains will discharge east of the site through wing-walled energy-dissipating structures, which will reduce flow velocities to non-eroding conditions. When drainage exits the outlet structures, it will flow over covered portions of the Colorado River Aqueduct.

Flows from the major confluence on the southern side of the main haul road will follow the original drainage pattern in a southeasterly direction through the town. An improved conveyance system from the creek neck to the county/private road fork will collect runoff from the 100-year frequency storm. The major components of this system will consist of unlined open trapezoidal channels, culverts at the rail crossing and the county/private road fork, and a wing-walled energy-dissipating outlet structure. Flows will be discharged south of the road fork at a non-eroding velocity. When drainage flows from the outlet structures, it will also flow over covered portions of the Colorado River Aqueduct. The proposed configuration of drainage facilities is shown in Figure 7.

Storm water that falls directly on areas which have been filled with covered refuse, i.e., uncontaminated surface flows, will be collected in a series of surface drains and conveyed to one of the storm water drainage systems described above. Storm water which comes into contact with refuse will be considered leachate, and will be collected, pumped, and transported to the wastewater pretreatment plant.

Runoff from the container handling yard will be contained by berming this area. Flows will be conveyed through a gravity interceptor to natural watercourses east of the project site. Gravity flow through the interceptor will remove floating grease and oil and solids from the runoff. Liquid remaining in the pipe after the storm will be pumped and transported to the pretreatment plant.

Landfill Gas Surface Emission Control System--

The landfill gas (LFG) emission and migration control system will initially consist of a grid of horizontal collection pipes laid in trenches in the refuse. The horizontal collection system will be constructed as filling operations proceed, while vertical extraction wells will be constructed on the benches and the highest elevations of the landfill to control LFG emissions. The LFG collection system will be connected to headers, which in turn will be connected to the LFG emission control/utilization system.

The initial plan for LFG utilization will be combustion in a system of one or more devices approved by the South Coast Air Quality Management District (SCAQMD). A supplemental fuel-fired burner may be used when LFG concentrations are too low to utilize the flare system. When LFG production is economically feasible and/or necessary to keep air emissions below EPA's Prevention of Significant Deterioration (PSD) threshold levels, the applicant will convert the flare system to an energy recovery facility. At higher gas flow levels, the applicant will construct energy recovery facilities to maintain emissions below EPA's PSD threshold levels.

Construction of the initial flare station will begin within 1 to 2 years following the start of landfilling operations. (LFG generation in the first 2 years is expected to be insignificant.) Design specifications of the flares (stack height, diameter) are also unknown at the present time. In accordance with current SCAQMD guidelines, the flares are expected to operate at a minimum temperature of 1,400°F and a residence time of 0.3 second. Figure 8 shows a typical sectional view of the LFG emission and migration control system.

The LFG control system will also consist of a series of gas migration probes placed around the perimeter of the site to detect any off-site gas migration. Probe spacing and depth will conform with SCAQMD and California Integrated Waste Management Board (CIWMB) guidelines.

Condensate Collection and Treatment--

LFG condensate will be collected in traps placed at low points along the gas collection system. The traps will be enclosed in double-walled underground tanks. Pump-mounted trucks will periodically remove the condensate and carry it either to the wastewater pretreatment facility or to storage pending disposal off site at a licensed hazardous waste disposal facility.

Landfill Operations

Hours of Operation--

Landfill operations will be conducted during daylight hours only (approximately 10 to 14 hours per operating day depending on the season). Actual working hours will vary on a seasonal basis. The container handling yard will operate with three 8-hour shifts. This schedule will provide sufficient time for the loading and unloading of rail cars so that an average rail car turnaround time of 28 to 29 hours can be maintained. During periods when the landfill is not operating, loaded containers will be removed from rail cars and highway transfer vehicles and either placed on a truck chassis and held in the yard or stacked until landfill operations resume the next day.

Security--

Access will be controlled by use of a gate at the entrance to the site and the existing fence which separates the town of Eagle Mountain from the mine. Because the terrain is extremely rugged and vehicular access is limited

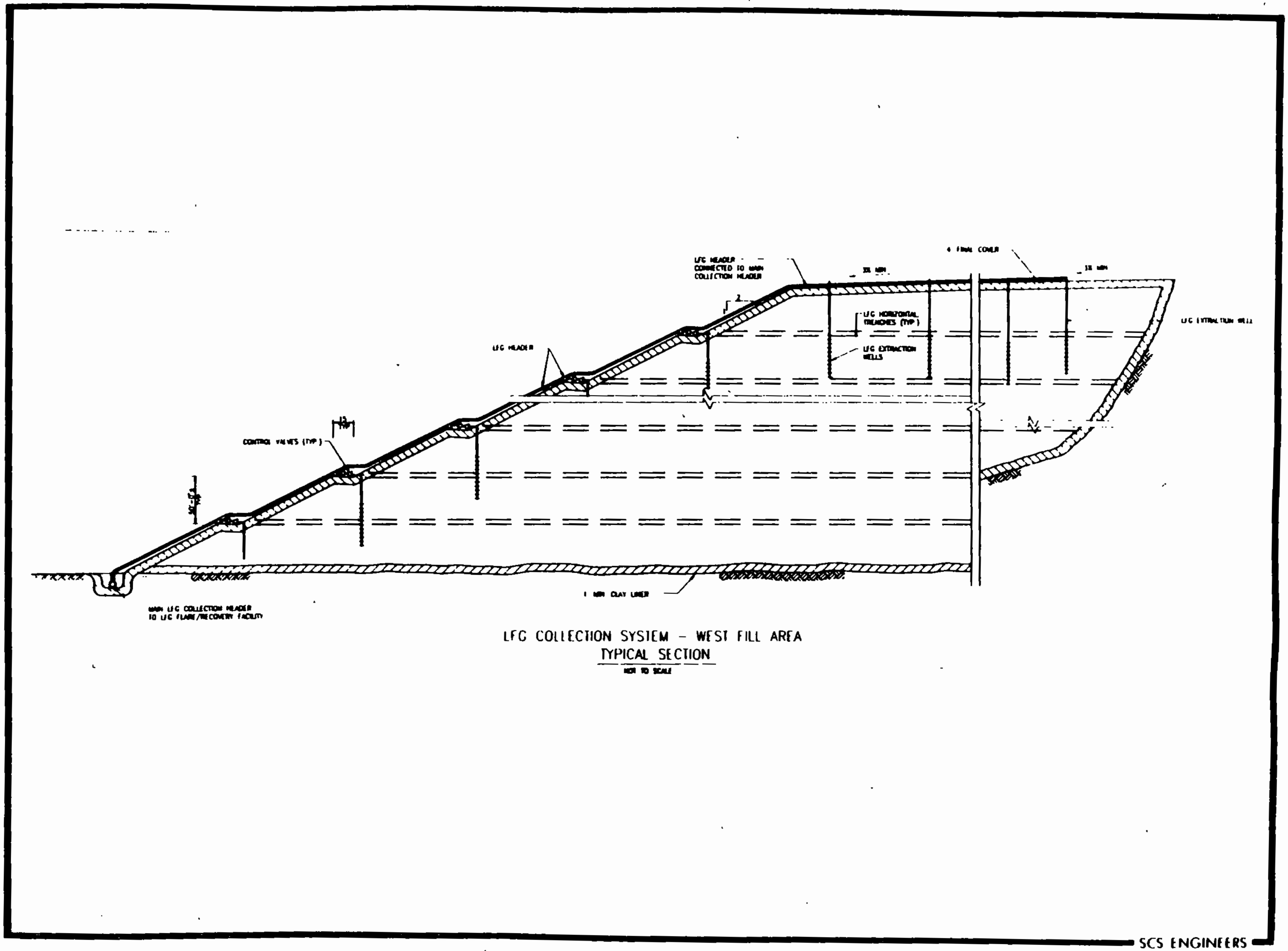


Figure 8. Typical Section of LFG Collection System.

HYDROGEOLOGY AND WATER QUALITY
PROPOSED EAGLE MOUNTAIN LANDFILL
RIVERSIDE COUNTY, CALIFORNIA

Prepared by:

Kenneth H. Lister
California Registered Geologist #4338
SCS Engineers
3711 Long Beach Boulevard
Ninth Floor
Long Beach, California 90807
(213) 426-9544

March 1990

File No. 190231-08

HYDROGEOLOGY/WATER QUALITY

Affected Environment

Watershed Characteristics

Geologic Setting
Areal Drainage
Ground Water Basins

Local Hydrology and Hydrogeology

Hydrogeologic Setting
Surface Water and Springs
Discharge of Water During Mining Operations
Local Ground Water Basin
Water Wells in Project Vicinity
Ground Water Usage and Water Supply
Background Ground Water Quality Monitoring
Local Water Quality
Occurrence and Movement of Ground Water
Ongoing Hydrogeological Work

Environmental Impacts

Surface Water
Ground Water

Leachate Production
Potential Leachate Flow Paths

Cumulative Impacts

Surface Water Quality
Ground Water Quality

Mitigation Measures

Measures Incorporated into Project Design

Ground Water Monitoring
Landfill Liner
Drainage Control
Leachate Collection System
Landfill Cover
LFG Control System
Control of Windblown Litter
Phasing

References

FIGURES

TABLES

HYDROGEOLOGY/WATER QUALITY

This section discusses hydrogeologic and water quality conditions that may be affected by the proposed project. Specific issues involve the hydrogeologic regime of the site, the existence and movement of ground water, ongoing and future monitoring of water quality, and compliance with state regulations pertaining to discharges of wastes to land.

The first part of this section describes the hydrogeologic regime of the northwestern Chuckwalla Valley and surrounding areas, and includes sections on past site activities, wells and water usage, and current ground water monitoring activities. Following this are subsections on impact assessment and proposed mitigation measures.

AFFECTED ENVIRONMENT

Watershed Characteristics

Geologic Setting--

Geologic setting has been discussed in the section on Geology/Soils. As stated there, the Eagle Mountain site is located in the Colorado Desert physiographic province of California. The topography of this province is characterized by isolated, north-south trending mountain ranges separated by broad, flat, alluvium-filled valleys.

The proposed landfill site itself lies at the eastern edge of the Eagle Mountains. This mountain range has elevations ranging from about 1,200 to about 5,350 feet above mean sea level (MSL). This and other mountain ranges in the area surrounding the site (the Chuckwalla, Coxcomb, and Palen Mountains) are made up predominantly of Mesozoic granitic rocks which are intruded into a metamorphic complex consisting predominantly of Paleozoic metasediments. The metamorphic rocks consist of marble, quartzite, schist, and minor gneiss.

Together with minor amounts of Quaternary basaltic extrusive igneous rock, the granitic and metamorphic rocks make up the exposed consolidated rock in the area. Regionally the older bedrock is cut by numerous inactive northwest-southeast trending faults which dip nearly vertically. The fault planes exhibit narrow, slickensided, clay-bearing, and brecciated zones which may show extensive solutional activity (Dubois and Brummett, 1968). In addition, well-developed joint systems are present in the Mesozoic and older rocks. These are discussed in greater detail below (see Potential Leachate Flow Paths).

Lying stratigraphically above the Mesozoic and older rocks are Quaternary and possibly Tertiary alluvial and other sedimentary deposits of continental origin. These deposits, consisting predominantly of sand and gravel with minor amounts of silt and clay, fill the valleys and can reach considerable thickness. Drilling in the Chuckwalla Valley indicates that porous alluvial fill is at least 1,200 feet thick, extending 3 miles east of the front of the Eagle Mountains. Some of the Quaternary alluvial deposits exposed in the eastern wall of the mine pit are semiconsolidated due to deposition of calcium carbonate cement (caliche) in the spaces between clastic grains. Some Quaternary dune sand and lacustrine clay, silt, and sand are exposed in the central portions of the valleys. No evidence of faulting young enough to affect Quaternary deposits has been found in the proposed project area.

Areal Drainage--

A discussion of areal drainage appears in the section on Drainage. As described there, drainage within area basins is internal. Surface drainage is from the surrounding mountains into the Pinto and Chuckwalla Valley basins. In the immediate project area, drainage is from the Eagle Mountains easterly into the Chuckwalla Valley.

During and immediately after heavy rains, ephemeral streams are formed within the Eagle Mountains and surrounding valleys. Stream flow within the Pinto Valley, north of the proposed landfill site, is predominantly easterly. Some surface water may flow from the Pinto Basin into the northwestern arm of the Chuckwalla Valley, which adjoins the proposed landfill site to the east.

finance these costs, and demonstrate the financial capacity to certify the availability of funds for 30 years after closure of the landfill.

Post-Closure Land Uses--

With a potential 115-year site life, the post-closure use of the site has not been planned at the current time. Settlement and the presence of gas collection facilities serve to limit the types of uses that can be developed after closure. Post-closure use of the landfill will be compatible with adjoining uses (e.g., Joshua Tree National Monument).

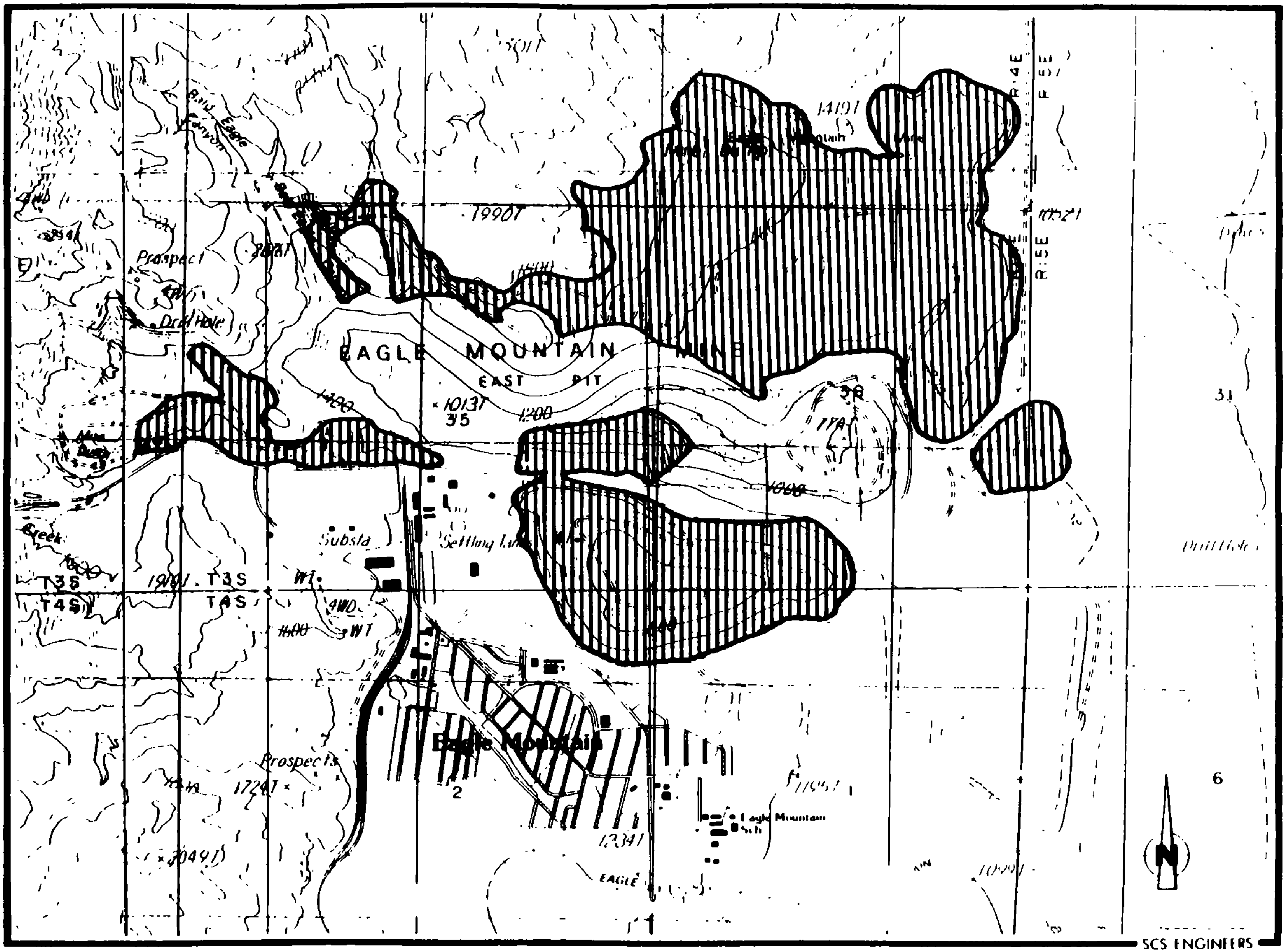


Figure 9. Spoils Area Locations.

Daily and intermediate cover requirements will average approximately 2,000 cubic yards per operating day. Other activities such as construction of temporary internal haul roads will increase the requirements for cover material to approximately 15 percent of the in-place volume occupied by the compacted refuse. Therefore, the total requirement for cover material will be approximately 4,000 cubic yards per operating day. Initially, cover material will be obtained from the tailing storage area located on the south wall of the East Pit. This storage area is estimated to contain more than 38,000,000 cubic yards. After this material in this location is exhausted, additional cover material will be obtained from other on-site overburden piles.

Upon completion of disposal activities, a minimum 4-foot-thick final cover will be applied to the landfill. To prevent ponding, the landfill crown will have a 3 percent minimum gradient in all directions. The cover will consist of three layers of soil, as follows:

- A 2-foot foundation layer (crushed rock) applied over the last lifts of refuse disposed at the facility.

- A minimum 1-foot-thick barrier layer with an effective permeability of 1×10^{-6} cm/sec, compacted to 90 percent relative density. The material for this layer will be the same as that used for the liner (e.g., mine process tailing).

- A vegetative layer will overlie the barrier layer. The vegetative layer will have a 1-foot minimum thickness, and will serve to protect the barrier layer, resist erosion, and support vegetative growth.

Closure--

Closure and closure planning will be completed in compliance with the requirements of the Local Enforcement Agency (Riverside County Health Department), the RWQCB, and the CIWMB. The closure plan prepared for the site will include provisions for continuing ground water monitoring, gas collection and control, site maintenance, landscaping, and grading. Existing CIWMB regulations require that the project applicant estimate closure costs, identify a method to

APPENDIX C

(except via the controlled access points), perimeter lighting and fencing are not proposed.

Dust Control--

Water from existing Kaiser water wells will be used, as needed, to control dust on the haul roads and within the operating areas (e.g., borrow areas) of the landfill. Although not proposed for use at the present time, the utilization of dust retardants on unpaved roads and within operating areas of the landfill will be subject to approval by the Riverside County Department of Health.

Container Handling Yard Operations--

Incoming trains will be routed to one of the sidings in the container handling yard. Locomotives will uncouple from the train and move to another siding to pick up a train loaded with empty containers. The additional sidings in the terminal will provide additional flexibility for the storage and marshalling of empty trains prior to transport back to Ferrum Junction.

After unit trains are positioned in the container handling yard, the containers with waste will be removed from the unit trains and placed on a chassis. The chassis will be hauled to the working face of the landfill where the containers will be emptied. The emptied containers will be returned to the container handling yard for reloading onto the unit trains. This yard will also include an area for loading/unloading containers from trucks. Loading and unloading of these containers will follow the same general procedures used for containers arriving by unit train.

Container Transport from Container Handling Yard to Working Face of the Landfill--

Containers loaded with refuse will be moved from unit trains or highway transport vehicles to the container handling vehicles in the container handling yard via large rubber-tired forklift vehicles or overhead cranes. Container handling vehicles will transport refuse-filled containers from the container handling yard to the working face of the landfill, and return the empty containers to the container handling yard for reloading on unit trains or trucks.

The proposed container handling vehicles will be two-axle semitrailers capable of carrying one container. These vehicles will be self-dumping (i.e., they will have a dumping platform added to the trailer configuration), operating in a manner similar to a roll-off truck. Hoist mechanisms will be hydraulically operated, with the hydraulic cylinder located on the trailer with the remainder of the hydraulic system located on the truck tractor and powered by the truck engine. The dumping platform will be designed to discharge refuse at the rear of the trailer.

All container handling vehicles will be designed to operate at a maximum speed of 50 miles per hour. This maximum speed, vehicle gearing, traffic pattern, and haul road design will enable these vehicles to maintain an average speed of 25 miles per hour (not including maneuvering time). The tractor will be powered with a 300-HP diesel engine.

Container Handling Process--

As described above, the loaded containers will be off-loaded from the trains and transfer vehicles and loaded onto the container handling vehicles using either large rubber-tired loaders or overhead cranes. A container can be loaded or unloaded from a container handling vehicle within 2 minutes (cycle time), using either of the handling methods described above.

In the early part of the second phase of the operation, the average one-way haul distance between the container handling yard and the working face will be 2 miles. Using the equipment described above, the average hauling time may range from 23 to 37 minutes. With operations limited to daylight hours, between 17 and 34 container handling vehicles will be used on a daily basis, with 3 or 4 additional vehicles available on site on a standby basis.

Operations at the Working Face of the Landfill

Operations at the working face of the landfill will include dumping refuse, bulldozing refuse at the working face, spreading and compacting the refuse, and application of daily cover at the end of each working day.

Refuse Dumping--

Conventional transfer trailers delivering waste to the facility will self-unload at the working face of the landfill. Refuse will be removed from shipping containers using self-dumping vehicles. Self-dumping vehicles will simply back up to the working face of the landfill and deposit refuse from the containers. These tippers will deposit the refuse from each container at the rear of the tipper near the refuse working face. After the refuse has been removed, the container handling vehicle will allow the elevated container(s) to return to their original position. Once the container is in its original position, the vehicle will leave the working face area and return to the container handling area.

Refuse Pushing, Spreading, and Compacting--

Containers will be emptied far enough to the rear of each vehicle so that a crawler tractor can remove each load of refuse from this area and push it to the working face before the next container is emptied. At the working face, crawler tractors will then spread the refuse to an average depth of 2 feet. Six crawler tractors will be required for the project.

After the crawler tractors have spread the refuse, the refuse will be compacted by diesel-powered landfill compactors. As final cell elevations are reached, crawler tractors will track-roll and level the refuse to minimize the requirements for daily cover. The compactors planned for use at the project site operate with a 315-HP diesel engine and have a width of almost 15 feet.

Landfill compactors for this operation will compact a minimum 2,000 tons of refuse per 10-hour day. Ten compactors will be in operation when the landfill is operating at maximum inflow.

Refuse placed, compacted, and covered each day comprises the working face (cell) of the landfill. Cell height, width, and length will be sized to minimize the required amount of daily cover. The working face will have a height of approximately 18 feet. The width will be sufficient to accommodate the self-dumping container handling vehicles selected for use at the project site. The front of the cell will have a slope of approximately 6:1 (horizontal:vertical); the side slopes will be approximately 3:1.

Each self-dumping container handling vehicle will require a width of approximately 18 feet at the working face. The use of these vehicles requires an 11-minute cycle time after which another vehicle will occupy this space. Self-dumping vehicles will deliver approximately 80 containers of refuse to the working face each hour. Assuming an 11-minute cycle time and by allowing the two outside vehicle dumping spots to be outside of the width of the working face, the required working face width will be 230 feet. Given this width, the cell will be advanced about 245 feet each working day.

<u>Availability and Application of Daily, Intermediate, and Final Cover</u>

The daily refuse cell will be prepared for placement of daily cover by leveling the surface (eliminating the high points and filling depressions) using crawler tractors. Following the leveling operation, crawler tractors will track-walk the refuse surface. A minimum of 6 inches of daily cover will be placed over the refuse by passing directly over the refuse, using either crawler tractors or self-propelled scrapers. Three additional crawler tractors will be required and may also be used to doze cover material from stockpiles located near the uncovered refuse.

Previous mining activities have generated large amounts of overburden rock or waste material (tailing) which will be used for daily and intermediate cover. This material is presently stored in several on-site areas located near and within the East Pit. Additional spoil areas located within and near the area proposed for landfill operations. The locations of spoil storage areas are shown in Figure 9.

materially to ground water recharge. This is due to the fact that the small amount of rainfall normally experienced evaporates rapidly in the arid climate, or is used by plants before deep percolation can occur.

Ground water flow in the Chuckwalla Valley is generally towards the east, with south-to-southwest flow in the northern arms of the valley. Depth to ground water measured from the surface varies from about 20 feet to over 300 feet. Ground water quality in the basin ranges from fairly good to poor, with TDS ranging from 274 to 12,300 mg/l (DWR, 1979). Koehler and Mallory (1981) state that the average TDS content of wells used in their study is 2,100 mg/l. Water quality is generally better than this average in the western parts of the valley, and becomes poorer in wells further east, particularly those near Ford Dry Lake. Fluoride content ranges from about 1 to about 12 mg/l, and is generally above federal drinking water standards; sulfate and sodium concentrations are relatively high as well. Additional information on ground water quality will be presented in succeeding sections of this report. Additional information on ground water flow rates is provided below in the subsection on the Occurrence and Movement of Ground Water.

Local Hydrology and Hydrogeology

Hydrogeologic Setting--

The hydrogeologic units in the Chuckwalla Valley area can be grouped into two broad categories: crystalline igneous and metamorphic rocks, and unconsolidated or semiconsolidated sedimentary deposits.

Crystalline rocks are described in more detail in the section on Geology and Soils. These rocks are generally considered to be non-water-bearing, since they does not normally yield usable quantities of water to wells. The matrix porosity of plutonic igneous and metamorphic rocks is very low. However, since much of the bedrock in the Eagle Mountains is fractured, it may be able to store water; moreover, the interconnectedness of fractures in the bedrock might provide pathways for the movement of ground water to wells.

Because water is readily available from the alluvial deposits in the northwestern Chuckwalla Valley, few attempts have been made to drill water production wells into the consolidated bedrock. One exception is the Eagle Mountain School Well (4S/14E-1M), which was drilled in late 1985, and completed in early 1986. In this well, alluvial deposits were encountered in approximately the upper 200 feet of the borehole, and bedrock was encountered below this depth down to 748 feet. The well was completed to produce water from fractured bedrock, with perforations at depths between 475 and 740 feet.

The unconsolidated and semiconsolidated sediments were deposited in a continental environment, mainly during Quaternary time; some of the sedimentary units penetrated by deep wells in the valley may be as old as late Tertiary. Most of the sediments were deposited in alluvial fan, stream channel, lake, or playa environments, though some were deposited as windblown sand. The majority of this material consists of alluvial sand and gravel, but some silts and clays were deposited as well, particularly in the central parts of the basin. Some of the alluvial material has been cemented by caliche.

In the northwestern Chuckwalla Valley, four Quaternary sedimentary units are encountered: alluvial fan deposits, younger alluvium, older alluvium, and windblown sand. These are described below.

The older alluvium is of Pleistocene age, and consists of fine to coarse sand interbedded with gravel, silt, and lesser amounts of clay. Recognizable clasts in near surface deposits are derived from the bedrock of the surrounding mountains. The color of the alluvium ranges from dark brown to red to grayish tan. Nodules and grain coatings of caliche are common. Surface exposures of the older alluvium are limited, but the unit is extensive in the subsurface where thickness ranges to over 300 feet. This unit yields water readily to wells, and is the most important aquifer in the area; however, lower permeability members within the older alluvium (such as debris flow deposits) may act as aquitards.

The fan deposits of Pleistocene age consist of poorly sorted boulders, gravel, coarse to fine sand, silt, and a minor amount of clay. This unit is found most typically at the margins of the valley, but fingers of alluvial fan deposits may extend in the subsurface almost to the center of the valley.

The fans are characterized by local areas of well-developed desert pavement on their surface. Color of the fan deposits ranges from brown to red to tan. The fan deposits are generally above the water table, and therefore do not form an important aquifer, although they are generally porous and permeable, and may form an important avenue for recharge of the ground water by runoff from the mountains.

The younger alluvium, of Holocene age, consists of gravel, sand, silt, and lesser amounts of clay. Color ranges from brown to tan. This unit is generally less than 25 feet in thickness, and is above the water table in most areas. The unit is, however, porous and permeable. It is most extensively developed in the central valley area.

A belt of windblown sand of Holocene age lies between the central axis of the valley of the northwestern Chuckwalla Valley and the Coxcomb Mountains. This deposit ranges in thickness up to 25 feet, and consists of medium- to fine-grained sand. This unit appears to be above the water table in all areas; however, similar units of Pleistocene age may exist in the subsurface, and could, in that case, yield water to wells.

Surface Water and Springs--

Surface drainage in the area of the project site is generally towards the east. Drainage within the central portion of the northwest Chuckwalla Valley is towards the southeast, in the direction of Palen Dry Lake. Drainage is more completely described in the section on Drainage.

There are no permanent, natural bodies of surface water in the Chuckwalla Valley. Surface drainage of precipitation follows heavy rains, but after the cessation of rainfall, surface water generally disappears in a short period of time because of percolation and evaporation.

No year-round springs have been reported in the northwestern Chuckwalla Valley. A number of springs having intermittent flow do, however, exist in the mountains which surround the northwestern Chuckwalla Valley; information on these is summarized on Table 3.

TABLE 3
INFORMATION ON SPRINGS
NORTHWEST CHUCKWALLA VALLEY

Name/Location*	Elevation (feet)	Dry/Flowing
Eagle Tank 3S/13E-23	2,040	
Buzzard 4S/14E-16	2,010	Dry (3/88)
Unnamed 4S/14E-16	2,400	
Hayfield Summit 5S/14E-19	1,900	
Long Tank 6S/15E-2	1,190	Flowing (6/61)

*Location: Township/Range-Section.

One prominent artificial surface water body exists in the vicinity of the project site. This is the Metropolitan Water District (MWD) Colorado River Aqueduct which, at its nearest point, lies approximately 1 mile east and 1/4 mile north of the northeastern edge of the East Pit. The MWD aqueduct is oriented approximately north-south in the area east of the project site, and water flow is from north to south. From about 1/4 mile north of the East Pit to the MWD Eagle Mountain Pumping Plant (which is located about 4 miles south of the project site), the aqueduct is covered.

Other surface water bodies within 10 miles of the proposed project site include a small industrial water-holding pond in the former Kaiser mill area (located about 2,500 feet south of the East Pit), holding ponds at the MWD Eagle Mountain pumping station (located about 4 miles south), and the artificial lakes at the Lake Tamarisk community (located about 9 miles southeast).

Discharge of Water During Mining Operations--

The proposed project location was formerly the site of iron mining, ore processing, and ancillary operations, which took place between 1943 and 1983. Some of these former operations resulted in the discharge of industrial water which had the potential for affecting ground water.

During mining operations at the Kaiser Eagle Mountain Iron Mine, wet waste rock (coarse tailing) was discharged from the ore processing plant onto a heap south of and adjacent to the East Pit. Large quantities of water were used to transport fine tailing (sand- to clay-sized particles) to the fine tailing basins located south of the East Pit.

The fine tailing basins cover a total area of approximately 540 acres. There are seven fine tailing basins, one of which (No. 7) never received tailing. Waste containment structures consist of berms or dikes constructed of alluvial material and crushed rock from mining operations. The berms are trapezoidal in cross section, and range up to about 80 feet in height. The inner surfaces of the berms and the floor of basin Nos. 4, 5, 6, and 7 were lined with compacted low-permeability fine tailing material; this material limited the amount of water which could percolate into the soil underlying the basins.

Based on measurements made during the early 1970's (Hawke Engineers, 1973), an average of about 2,600 acre-feet of water per year was discharged to the fine tailing basins. Normally, slightly over half of this water was pumped out of the basins and recycled to the process plant. An additional approximately 650 acre-feet were lost to evaporation, and perhaps 300 acre-feet remained in the interstices between sediment grains. The remaining approximately 300 acre-feet were lost from the system annually; much of this water may have percolated into the alluvial sediments below the tailing basins.

Coarse crushed tailing (less than 3/4 inch in diameter) were conveyed to the top of a heap which eventually covered approximately 120 acres, and contained a volume of tailing roughly estimated at 38,000,000 cubic yards. It is not possible to accurately estimate the amount of water which was codisposed with the coarse crushed tailing in this area, but it is estimated to be in the range of 2,500 to 7,000 acre-feet.

In addition to water discharged with the tailing during ore processing operations, water encountered during mining operations which seeped into the central portion of the East Pit was pumped from this part of the pit, and discharged into alluvium near the eastern end of the pit. A description of the circumstances surrounding water seepage into the East Pit is provided below.

Based on recollections of Kaiser mine personnel, seepage of water into the central portion of the East Pit began in mid-1978, when mining operations at the 735-foot elevation encountered a near-vertical fracture zone. By early 1979, when the entire central portion of the pit had been excavated to the 735-foot level, wet areas had formed across the width of the pit. Subsequent blasting caused the wet areas to dry as the water infiltrated into the blast rubble.

By the first quarter of 1980, the pit bottom had been excavated to an elevation of 720 feet MSL. Water was flowing from several locations along the south wall of the pit. Water was pumped out of the central areas of the pit to a higher elevation in the eastern portion of the pit, where it was discharged onto the land surface and allowed to percolate into the alluvium. During the second quarter of 1980, an attempt was made to excavate to elevation 705 feet, but activity in this part of the pit had to be abandoned because water was interfering with operations, and Kaiser declined to procure the additional pumping equipment needed to remove the water. The water level in the pit subsequently rose to a maximum recorded elevation of 752 feet MSL in June of 1982. Since 1982, the water level in the East Pit pond has dropped. Current water level in the pond is at an elevation of approximately 709 feet.

The water source for this seepage may have been natural ground water, water from tailing stockpiles located just south of the East Pit, or ground water mounded up in this area due to local recharge from water codisposed with tailing. Chemical evidence suggestive of a similarity of the seepage water to mine process water may indicate some contribution to the seepage from process water which infiltrated the ground in areas of tailing disposal. Major ion composition of water from several sources in the Eagle Mountain area are plotted on a trilinear diagram on Figure 3. This diagram indicates a chemical similarity between East Pit pond water and mine process water. Water from a monitoring well (MW-3) located about 2,500 feet west of the pond also contains similar proportions of major ions.

The elevation of the water surface of the pond is currently approximately 710 feet MSL. This elevation is within 50 feet of that in all wells within a radius of 7,500 feet of the pond. During January and February 1990, water was pumped from the East Pit pond into a plastic membrane-lined holding basin. Approximately 40,000 gallons of water were pumped from the pond over a 10-day period. Pumping at rates of up to 100 gallons per minute resulted in lowering the pond water level up to 9 inches. After each episode of pumping, the water level was allowed to recover, and eventually reached approximately to its original elevation. Recharge rates of up to approximately 40 gallons per minute were measured. The fact that the pond water level recovered relatively rapidly after large quantities of water were pumped indicates the existence of substantial bank storage in the area.

Water samples were taken before and after pumping, and samples were chemically analyzed. TDS of the water decreased from 14,000 to 4,700 mg/l, for a reduction to about one third in dissolved solids. This confirms earlier evidence that water in the pond had become saltier through time, and the inference that

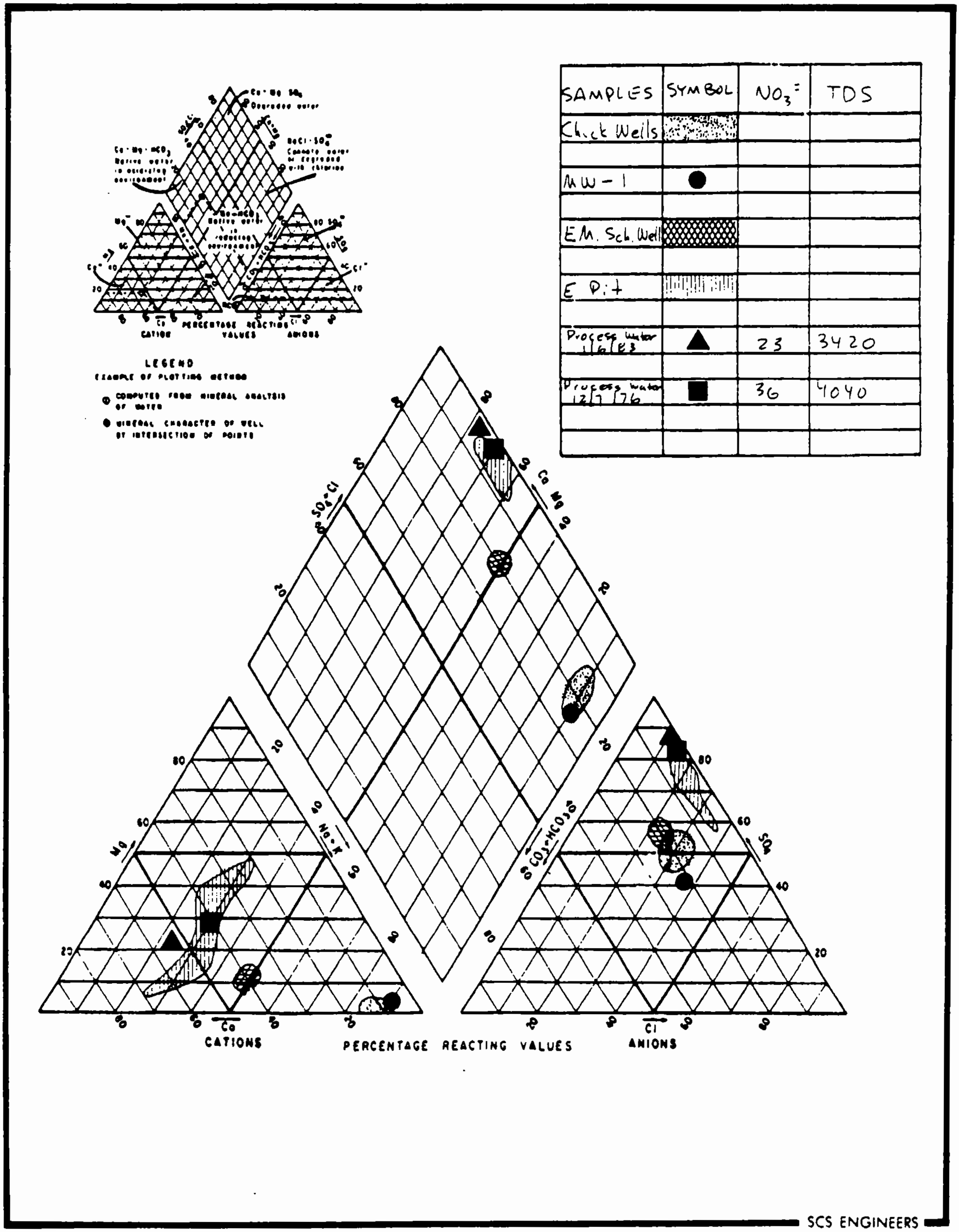


Figure 3. Trilinear Diagram, Ground Water and Process Water Quality.

the pond had been acting as an evaporative sink. Because of the large quantity of precipitated salts which exist in the soil in the vicinity of the pond from earlier evaporation, it is likely that the 4,700 mg/l measured for the pond water after pumping is higher than that of water stored in the bedrock walls of the pond, and results in part from the dissolution of these precipitated salts.

Local Ground Water Basin--

The local ground water basin for this project is situated in the northwestern Chuckwalla Valley and adjacent upland areas. The principal aquifer in this area is the Pleistocene older alluvium, which consists of fine to coarse sand interbedded with gravel, silt, and lesser amounts of clay (Giessner, 1963). This unit is locally cemented with caliche. Well logs from the four Chuckwalla wells (4S/15E-10B, 4S/15E-2D, 4S/15E-2P, 4S/15E-11R) drilled by Kaiser Steel indicate that in this area (about 5 to 6 miles east-southeast of the project site), the sands and gravels of the older alluvium extend to a depth of about 300 to 450 feet below ground surface (Figure 4). Below this, the predominantly sandy section gives way to clay and shale.

Ground water has been produced from Chuckwalla Valley older alluvium at Kaiser Chuckwalla Well Nos. 1 through 4. Water from these wells has been used for industrial purposes at the Eagle Mountain Iron Mine, and is now being used for nondrinking domestic purposes at the town of Eagle Mountain. Pumping tests conducted at these wells following installation (1964 through 1977) indicate that the wells are capable of producing water at rates between 1,000 and 2,800 gallons per minute (see Table 4).

Based on pumping rates during these tests, water level drawdown, and well dimensions, the permeability (hydraulic conductivity) can be estimated (SCS Engineers, 1989c). Since Well No. 1 produces significant quantities of sand, the permeability estimated from this well's test data is probably less representative of aquifer permeability. Permeabilities at Well Nos. 2, 3, and 4 are estimated to be between 1.2 x 10^{-2} and 1.5 x 10^{-2} cm/sec. These values are somewhat lower than those estimated to occur in the Desert Center area (Koehler and Mallory, 1981).

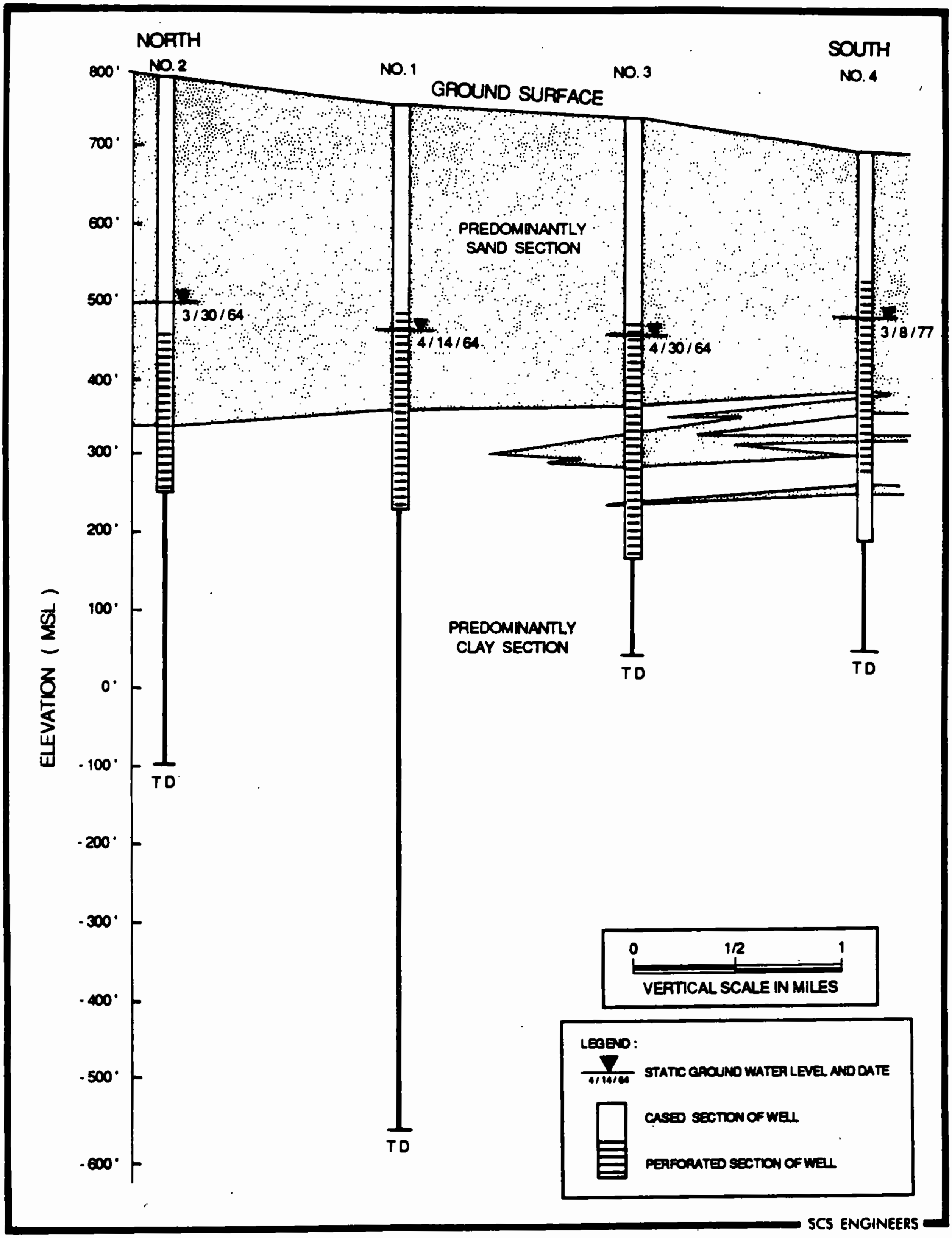


Figure 4. Well Logs, Kaiser Chuckwalla Valley Wells.

TABLE 4. WELL TEST DATA - KAISER CHUCKWALLA WELLS

Well No.	Pump Rate (gal/min)	Drawdown (feet)	Well Diameter (inches)	Well Length Screened (feet)	Aquifer Interval Screened (feet)	Estimated Permeability (cm/sec)
CW-1* 4S/15E-10B	1,000	75	16	241	121	6.2×10^{-3}
CW-2 4S/15E-2D	2,400	78	16	196	116	1.5×10^{-2}
CW-3 4S/15E-2P	2,800	78	16	289	169	1.3×10^{-2}
CW-4 4S/15E-11R	1,150	32	16	240	180	1.2×10^{-2}

* This well has a tendency to produce sand along with water; as a result, this permeability is probably not as good an estimate of aquifer permeability as the other wells.

Other geologic units within the northwestern Chuckwalla Valley are not important aquifers, because they are either predominantly above the water table or do not consist of sufficiently permeable materials (see subsection on Ground Water Basins, above).

The upland areas surrounding the valley are underlain principally by bedrock which consists of intrusive igneous and metamorphic rocks ranging in age from early Paleozoic to Cretaceous. Thin deposits of Quaternary alluvium are found in stream courses within the uplands as well. The alluvial deposits are generally above the water table, and therefore are not water-bearing. Portions of the bedrock contain ground water held in fractures in the rock.

Bedrock, even in areas where it contains water, has generally not been considered water-bearing in the past, since it was assumed that wells completed in bedrock would not yield sufficient quantities of water for most uses. It is now known from drilling of water wells in other areas of the state that even crystalline rocks (such as granites) can yield sufficient water to wells to provide a usable supply to one or a few residences, if the rocks are highly fractured and the fractures are interconnected. In addition, the completion of the Eagle Mountain School Well in the town of Eagle Mountain in 1986 demonstrated that some fractured bedrock in the project area can yield usable quantities of water to wells.

The Eagle Mountain School Well was drilled to a depth of 748 feet (Figure 5). This well is located about 2,000 feet south of the East Pit. Bedrock was encountered beginning at a depth of about 200 feet. The well was completed with the screened sections entirely within the bedrock portion of the hole at depths from 475 to 740 feet. Static water level was at an elevation of 779 feet MSL shortly after well completion in January 1985. This fractured bedrock section is capable of yielding water at a rate of 90 to 95 gallons per minute with the present 15-horsepower submersible pump. During testing after well construction, the well was pumped at a sustained rate of 75 gallons per minute for 24 hours; this resulted in a drawdown of 11 feet. Based on results of this pump test, permeability of the water-bearing section penetrated in this well has been calculated at 1.8 x 10-3 cm/sec (SCS Engineers, 1989).

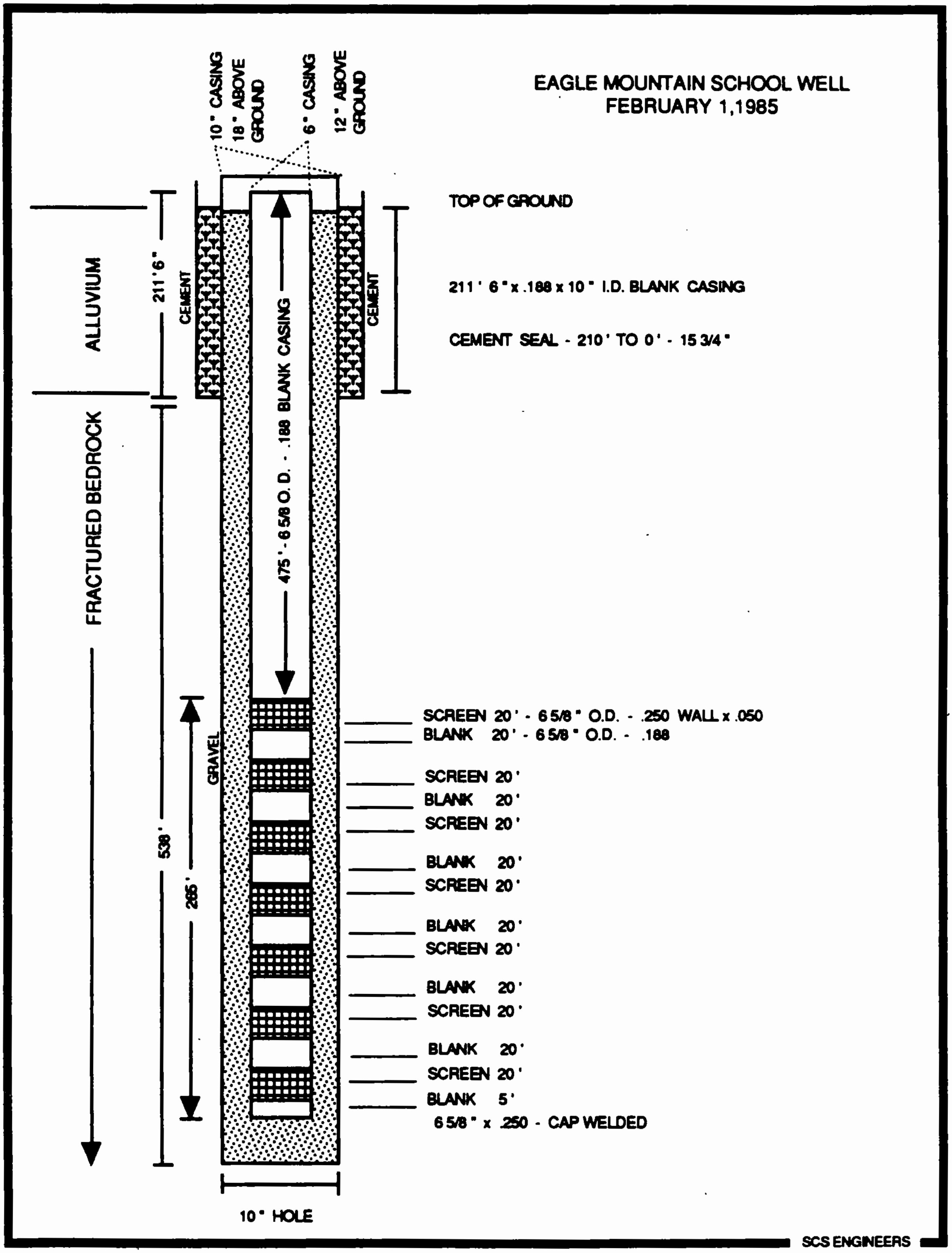


Figure 5. Well Log, Eagle Mountain School Well.

The water-bearing bedrock of this well is located beneath 200 feet of alluvium at the margin of the Chuckwalla Valley. Since the valley margin is where most ground water recharge due to runoff is thought to occur, this well may be optimally located for water production from bedrock. It is not known whether bedrock within the area of the Eagle Mountains without alluvial cover would yield usable quantities of water over time. In this situation, recharge probably occurs at a very low rate due to the fact that there is little or no overlying alluvium to hold water derived from precipitation. In addition, monitoring well MW-3, which was completed in bedrock in the western portion of the East Pit, is able to produce sufficient ground water for sampling. The school well (MW-2) and the East Pit pond indicate, however, that in some areas the bedrock is sufficiently fractured to provide ground water storage capacity and pathways for water to move.

Water Wells in Project Vicinity--

To determine the points at which ground water is withdrawn for use in the northwestern Chuckwalla Valley, and their distance from the project site, a canvass of well locations was performed. Locations of known water wells within 10 miles of the project site are shown on Figure 6. Descriptive information on these wells and wells now destroyed is presented in Table 5.

The nearest wells to the project site are the Eagle Mountain School Well discussed above and monitoring wells MW-1, MW-2, and MW-3. MW-1 (3S/14E-36H) is located about 2,000 feet east of the East Pit. MW-1 was drilled and completed during April and May of 1989, at the direction of Mine Reclamation Corporation (MRC). The purpose of this well is to provide one of four ground water monitoring points to determine background water quality in the vicinity of the project site. Quarterly water quality monitoring activities for the site are described in the subsection on Background Ground Water Quality Monitoring.

MW-1 was drilled to a total depth of 400 feet through alluvium consisting of fine to coarse sand, gravel, silt, and a minor amount of clay. The log prepared by geologists during site drilling is reproduced in this appendix. The well was cased with 5-inch-diameter Schedule 80 PVC to 385 feet, with the

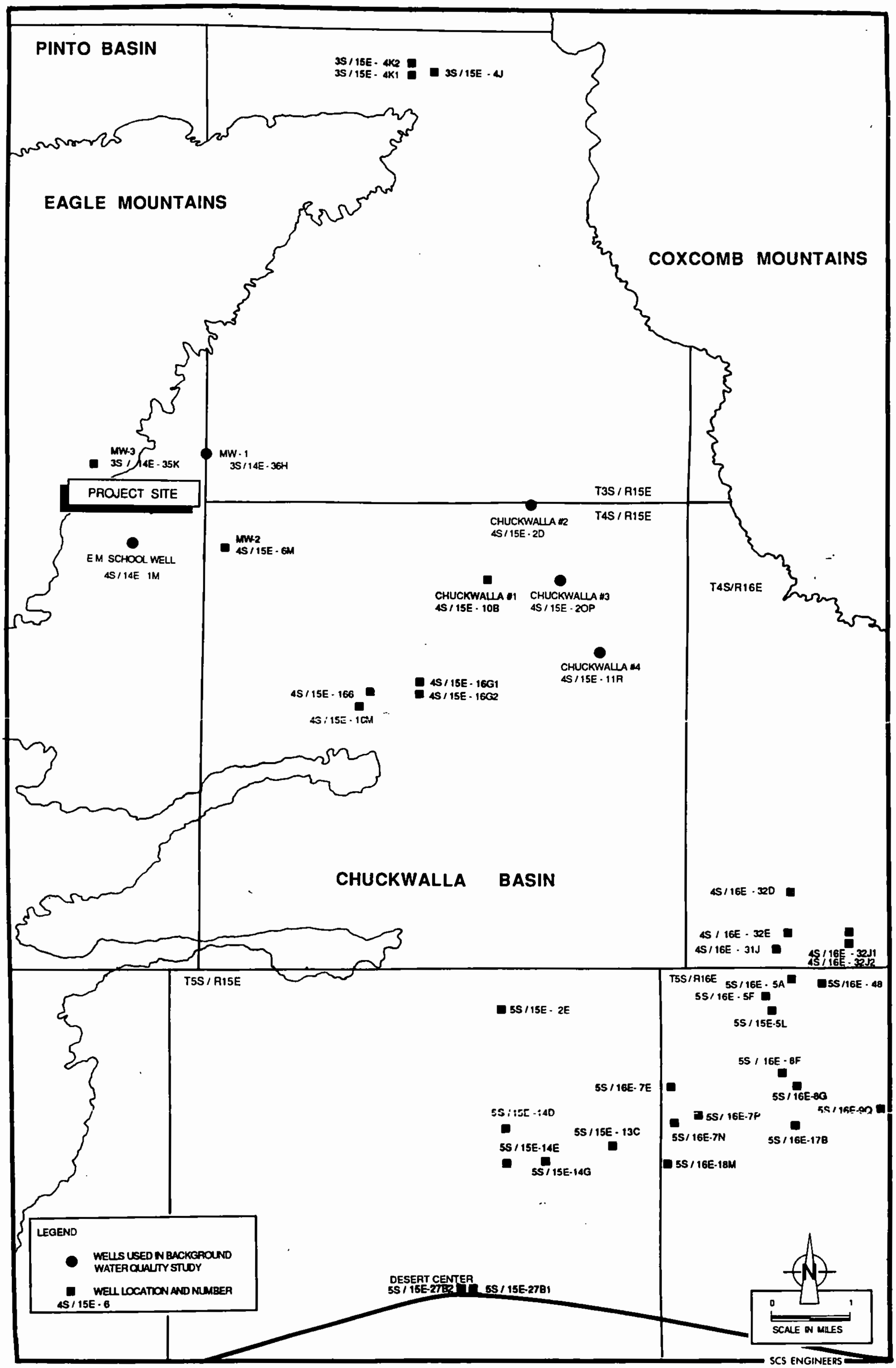


Figure 6. Northwest Chuckwalla Valley, Including Wells

TABLE 5: WATER WELLS WITHIN 10 MILES OF PROJECT SITE, EAGLE MOUNTAIN

Well	Blk.Eagle	MW-1	Pinto 2	KS Pinto 1	KS Pinto 9	EM School	KS Chuck.1	KS Chuck.2
Well #	3S/13E-1A	3S/14E-36H	3S/15E-4J	3S/15E-4K1	3S/15E-4K2	4S/14E-1M	4S/15E-10B	4S/15E-2D
Depth (ft)		386	532	532	658	740	520	535
Casing Diam.(in)		5	16	16	20	6.625	16	16
Perforated Int.(U)		326	250	390	449	475	271	331
Perforated Int.(L)		386	520	532	658	735	512	527
Date Completed		5/16/89	1954	1933	1957	2/1/86	4/14/64	3/30/64
Depth to Water (ft)		332.21			122	456	273	326
Date W.L. Measured		9/26/89			9/11/89	1/7/86	2/13/86	3/20/89
Altitude (ft MSL)		1045	1080.6	1048.1	1059	1240	749	793
Active/Destroyed	D	A	I	I	I	A	I	A
Yield (gpm)			1480	330	1200	75	1000	2400
Specific Capacity (g/ft)			45	18	19	6.8	13.3	30.8
Log		Y	Y	Y	Y	Y	Y	Y
Water Quality		Y	Y	Y	Y	Y	N	Y

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	KS Chuck.3	KS Chuck.4	MWD	Des. Utopia	Morris	Charpied	DaVall	Zwang
Well #	4S/15E-2P	4S/15E-11R	4S/15E-13C	4S/15E-16M1	4S/15E-16M2	4S/15E-16G	4S/15E-36A	4S/16E-19M
Depth (ft)	570	500	452	615	600		900	585
Casing Diam.(in	16	16	16	8.625	6.625		12.75	16
Perf. (U)	273	170	220	311	300		216	
Perf. (L)	562	500	328	615	600		900	
Date Compl.	4/30/64	3/8/77	1932	3/29/66	4/6/79		5/24/74	1961
Depth Water	262.4	227	183.7	304			105	126.9
Date W.L.	9/26/89	8/24/89	8/2/61	3/29/66			5/24/74	6/10/61
Altitude	737	699	683	822	820	773	585	621
Active/Dest.	I	A	I	A		A		I
Yield (gpm)	2800	1150	450					
Sp. Capacity	35.9	35.9						
Log	Y	Y	Y	Y	Y	N	Y	N
Water Qual.	N	Y	N	Y	N	Y	N	N

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	unknown	unknown	Tyler	unknown	Zwang	unknown	Penfield	J320 Ltd.
Well #	4S/16E-19P	4S/16E-21N	4S/16E-28H	4S/16E-29R	4S/16E-30D	4S/16E-30E	4S/16E-31D	4S/16E-31J
Depth (ft)	151	39	598	110	610		600	
Casing Diam.(in	6	12	10.75	12	16		15	
Perf. (U)			286					
Perf. (L)			588					
Date Compl.			12/19/79				1961	
Depth Water	111.6		50	79.9	113.9		95	
Date W.L.	4/21/61		12/19/79	10/6/61	5/17/61		6/15/61	
Altitude	600	565	523	545	607	591	581	545
Active/Dest.	I	D	A					A
Yield (gpm)					5075		2328	
Sp. Capacity							44.8	
Log	N	N	Y	N	N		Y	
Water Qual.	N	N	N	Y	Y		Y	

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	Boulder	Gesell	U.S.	Aljoba	Palladine*	Palen	MWD	Hillman 1
Well #	4S/16E-31R	4S/16E-32D	4S/16E-32E	4S/16E-32J	4S/16E-32M	4S/16E-35P	5S/14E-24R	5S/14E-35L1
Depth (ft)	36	610	77		555		733	600
Casing Diam.(in	6	14			12		6.5	8
Perf. (U)		137			265			
Perf. (L)		597			555			
Date Compl.	1907	3/30/53			1958		1933	1958
Depth Water		78.5			71.4		570	570
Date W.L.		10/6/61			6/16/61		1/31/33	11/9/61
Altitude	555	558	555	534	548	470	1072	1270
Active/Dest.	D	A	D	A	A	D	D	
Yield (gpm)		2750			2000			2
Sp. Capacity		80.9						
Log	N	Y	N	N	Y	N	Y	N
Water Qual.	N	Y	N	Y	Y	N	N	N

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	Hillman 2	Campbell	Beard	Franna*	Gribbin	Kanne	Ironwood	Franna
Well #	5S/14E-35L2	5S/14E-36A	5S/15E-1E	5S/15E-1L	5S/15E-2E	5S/15E-12N	5S/15E-12R	5S/15E-13B
Depth (ft)	641	877	755	784	728	746	400	788
Casing Diam.(in	8	10		16	16	16		12
Perf. (U)				349		526		215
Perf. (L)				784		746		788
Date Compl.	1961	1958		1960	1960	1961	6/65	1959
Depth Water	571	485.3	145.8	138.5	209.8	173.1		159.9
Date W.L.	11/9/61	4/9/61	6/10/61	6/10/61	6/10/61	4/28/61		9/18/61
Altitude	1270	1190	641	640	692	688	671	650
Active/Dest.		D			A			D
Yield (gpm)	6			3150		1900		3200
Sp. Capacity				42.6				16.8
Log	N	N	N	Y	N	Y	N	Y
Water Qual.	N	N	N	Y	N	Y	N	Y

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	McGoo's	Lk.Tam.4	Lk.Tam.2	Lk.Tam.1	Reese	Ragsdale	Ragsdale	Morring
Well #	5S/15E-13C	5S/15E-14D	5S/15E-14D	5S/15E-14G	5S/15E-15E	5S/15E-20	5S/15E-23N	5S/15E-23M1
Depth (ft)		1024	369	369	808	575	409	570
Casing Diam.(in)		16			16	8.625	6	6.625
Perf. (U)		780				455	369	490
Perf. (L)		1000				575	409	550
Date Compl.		7/18/68			1960	1/22/69	7/8/53	7/28/70
Depth Water				233	313.4	369	367	324
Date W.L.				9/11/89	6/11/61	1/22/69	3/28/61	7/28/70
Altitude	655	736	746	717	805		880	814
Active/Dest.	A	A	A	I				
Yield (gpm)		2400			2000			
Sp. Capacity		23.8			60.6			
Log	N	Y	N	N	N	Y	Y	Y
Water Qual.	Y	Y	Y	N	N	N	N	N

TABLE H5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	Morring	Ragsdale	C.Div.Hwy.*	Ragsdale	Ragsdale	Hancock	Capps	Carney
Well #	5S/15E-23M2	5S/15E-26	5S/15E-27B	5S/15E-27B	5S/15E-27H	5S/15E-29F	5S/16E-4D	5S/16E-5B1
Depth (ft)	550	603	637		598	680		114
Casing Diam.(in	6.625	8.625	10	8	12	6		6
Perf. (U)	360	443	553		430			
Perf. (L)	540	603	625		598			
Date Compl.	3/17/81	10/27/63	1954	1925	2/17/51			1948
Depth Water	400	352	395.1					70.9
Date W.L.	3/17/81	10/27/63	6/10/61					4/7/61
Altitude	815		900	900	904	1046	530	560
Active/Dest.				D	D	D	A	A
Yield (gpm)								
Sp. Capacity								
Log	Y	Y	Y	N	Y	N	N	N
Water Qual.	N	N	Y	N	N	Y	Y	Y

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	unknown	NewCal	Anderson	Peterson	Brown	Brown	Brown	Brees
Well #	5S/16E-5B2	5S/16E-5F1	5S/16E-5F2	5S/16E-6N	5S/16E-7M1	5S/16E-7M2	5S/16E-7	5S/16E-7
Depth (ft)		460	715	723	648	789	420	377
Casing Diam.(in)		10	12	12.75		12	6.625	6.625
Perf. (U)		240	224	228		280	320	297
Perf. (L)		460	705	722		789	420	377
Date Compl.		4/7/80	1960	1960	1958	1959	6/8/76	7/25/78
Depth Water		78	68.6		126.9	126.2	141	
Date W.L.		4/7/80	6/10/61		8/6/61	9/7/61	6/8/76	
Altitude		542	548	602	614	611		
Active/Dest.	A	A	D		A			
Yield (gpm)		760	1589	3850		3082		
Sp. Capacity		4.2	18.9	71.3		37.1		
Log	N	Y	Y	Y	N	Y	Y	Y
Water Qual.	N	N	Y	Y	Y	Y	N	N

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	Shorter	S.C.Gas	S.C.Gas	Airport	D.C.Farms	Airport	D.C.Farms	D.C.Farms
Well #	5S/16E-7	5S/16E-7P1	5S/16E-7P2	5S/16E-8F	5S/16E-8G	5S/16E-8K	5S/16E-8Q	5S/16E-9D
Depth (ft)	390	347	800	206		212		
Casing Diam.(in	6.625	8		14		14		
Perf. (U)	288	248		103		103		
Perf. (L)	390	347		188		198		
Date Compl.	11/12/71	9/19/52	1/86	1942		1942		
Depth Water	140	228	255	60		83		
Date W.L.	11/12/71	6/85	5/6/88	9/11/89		8/6/61		
Altitude		598	598	546	541	555	555	530
Active/Dest.		D	A	I	I	D	I	I
Yield (gpm)						180		
Sp. Capacity						9		
Log	Y	Y	N	Y		N	N	N
Water Qual.	N	N	N	Y		N	N	N

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	Corona	Des.Res.	unknown	Belsby	Gruendike	Belsby	Aljoba S	unknown
Well #	5S/16E-9E	5S/16E-9Q	5S/16E-14D	5S/16E-14N	5S/16E-15D	5S/16E-16Q	5S/16E-18M	5S/16E-18Q
Depth (ft)				480	76	485	790	37
Casing Diam.(in	6			10.75		10.75	15	
Perf. (U)				240		267		
Perf. (L)				480		485		
Date Compl.				3/29/79	1918	1/12/79	1960	
Depth Water							160.6	
Date W.L.							4/21/61	
Altitude	545	519	499	559	521	584	646	
Active/Dest.	D	A	D		D		A	D
Yield (gpm)				500		800		
Sp. Capacity								
Log	N	N	N	Y	N	Y	N	N
Water Qual.	N	N	N	N	N	N	Y	N

TABLE 5: INFORMATION ON WATER WELLS, EAGLE MOUNTIAN (CONTINUED)

Well	unnamed	Harmon	Ironwood
Well #	5S/16E-22N	5S/16E-25H	5S/16E-36F
Depth (ft)	516	680	357
Casing Diam.(in	6	14	6
Perf. (U)			261
Perf. (L)			357
Date Compl.		1956	6/3/55
Depth Water	188.2	134.6	274.1
Date W.L.	6/15/61	5/16/61	6/9/61
Altitude	653	603	730
Active/Dest.			
Yield (gpm)		1200	
Sp. Capacity			
Log	N	N	Y
Water Qual.	Y	Y	N

lowermost 60 feet of casing perforated (0.020-inch machine-cut slots). Static elevation of water was 717 feet MSL on September 26, 1989.

During March and April 1990, two additional ground water monitoring wells were installed in the Eagle Mountain area. Well MW-2 (4S/15E-GM) is located approximately 5,000 feet southeast of the East Pit, and MW-3 (3S/14E-35K) is located within the western portion of the East Pit.

MW-2 (4S/15E- M) was initially drilled using the dual-wall reverse circulation air rotary method to facilitate logging the geologic units penetrated; the 5-inch pilot hole was enlarged to 10 inches using a mud rotary system. Drilling penetrated only alluvium consisting of fine to coarse sand, gravel, silt, and some clay (well log in Appendix). MW-2 was constructed of 61 feet of 4-inch stainless steel screen and stainless/carbon steel blank casing to a total depth of 455 feet. After development, static water level was measured at 693 feet MSL. Water sampled from this well had TDS of 860 to 930 mg/l; water chemistry, in general, resembled that of other alluvial wells being of the sodium type, although the relative concentration of calcium and sulfate is slightly higher in MW-2, while the relative concentration of sodium and bicarbonate is slightly lower than in other nearby alluvial wells. Fluoride concentration (3.2 to 4.6 mg/l) is intermediate between that of the Kaiser Chuckwalla wells and the wells closer to the mine site.

MW-3 (3S/14E-35L) was drilled using a reverse circulation air rotary method with a downhole percussion hammer drilling and 8-inch hole to 380 feet. Drilling penetrated primarily metamorphic rocks consisting of quartzite, meta-arkose, and calc-silicate hornfels; the iron ore which is within the metamorphic sequence was encountered between depths of 90 and 150 feet (see log in this appendix). MW-3 was constructed of 61 feet of 4-inch stainless steel screen and stainless/carbon steel blank casing to a total depth of 350 feet. After development, static water level was measured at 757 feet MSL. Water sampled from this well had TDS of 1,600 to 2,400 mg/l; water chemistry is of a sodium + calcium sulfate type and, in general, resembles that of the School Well, although the relative concentration of sulfate is higher in MW-3, while the relative concentration of sodium is lower. Proportions of major ions are similar to those measured in the East Pit pond. Fluoride concentration (0.7 to 1.6 mg/l) is somewhat lower than that of the School Well.

TABLE 6
POTENTIAL 1986 WATER USE

Use	Rate	Acre-feet
Irrigated Crops		
Jojoba	4,005 acres @ 2.2 acre-feet/year	8,811
Jojoba with asparagus	457 acres @ 4.6 acre-feet/year	2,102
Asparagus	1,309 acres @ 8.3 acre-feet/year	10,865
Citrus	14 acres @ 4.5 acre-feet/year	63
Dates	14 acres @ 8.0 acre-feet/year	112
Vines	5 acres @ 4.5 acre-feet/year	23
Pasture	10 acres @ 6.4 acre-feet/year	64
Total		22,040
Tamarisk Lake development		865
Gas company		5
Miscellaneous domestic		50
TOTAL		22,960

Ground Water Usage and Water Supply--

Water uses in the northwestern Chuckwalla Valley include domestic (drinking and other), agricultural (principally irrigation), and industrial. The Kaiser Chuckwalla wells have, in the past, been used principally for industrial water supply. The Eagle Mountain School Well was used previously for domestic water supply, although it is not actively being pumped at the present time.

MW-1, MW-2, and MW-3 are used only for ground water quality monitoring. Most of the other water wells within 10 miles of the project site are used either for domestic or irrigation supply. One exception is the Southern California Gas Company Well near the Desert Center Airport, which is used to supply cooling water for gas compression equipment.

Chuckwalla Valley ground water use was the subject of a study by John Mann (1986). The study indicated that approximately 23,000 acre-feet of ground water was expected to be withdrawn from the northwestern Chuckwalla Valley during 1986 (Table 6). Mann's study showed that this rate of water use would result in an overdraft condition (more water being withdrawn than being added through recharge) for the ground water basin. The greatest volume of water at the time of this study was being used for irrigation.

Since 1986, the acreage in agricultural use seems not to have increased and may have decreased. For this reason, overall water use should not be significantly greater than the amounts estimated in 1986. If overall water use has remained approximately constant since the time of Mann's study, this would suggest that the northwestern Chuckwalla Valley may still be in an overdraft condition.

Total usable water reserves in the northeastern portion of the Chuckwalla Valley were estimated by Mann to be approximately 1 million acre-feet, assuming 100 feet of saturated sediments and a specific yield of 15 percent. This estimate is probably conservative, particularly in light of the fact that probably 200 or more feet of saturated sediments underlie the central portion of the Chuckwalla Valley.

The Mann study also indicated that the water level in one well (Southern California Gas Company [SCGC] well; 5S/16E-7P) in an area of concentrated agricultural activity in the northwestern Chuckwalla Valley experienced as much as 105 feet of drop during a 5-year period, beginning in 1981. However, other wells in this area do not show such a great change in water level. More recent information from SCGC indicates that this well (5S/16E-7P) was replaced with a new well in 1986 (Personal Communication, Jim Green, SCGC, Blythe). Water in the replacement well has fluctuated within a range of only about 5 feet between the years 1986 and 1989.

Background Ground Water Quality Monitoring--

Background water quality characterization in the project area is necessary to meet the requirements of the California Administrative Code, Title 23, Waters, Chapter 3, Subchapter 15 (Section 2595, g, 7). These regulations are administered by the Regional Water Quality Control Board (RWQCB). To satisfy the regulations, a program for systematic collection of data on ground water quality was initiated in June 1989. The program for background ground water quality monitoring in the project area was based on that proposed in an October 1988 report by SCS Engineers and approved by the RWQCB.

The monitoring program was designed to characterize ground water quality in the vicinity of the project site. The proposal called for the drilling of two 400-foot-deep exploratory borings, one located about 2,000 feet east of the East Pit (downgradient), and one located about 3,000 feet southwest of the pit (upgradient). Two upgradient holes were subsequently drilled, one to 230 feet and one to 400 feet. Both of these holes, drilled in igneous plutonic and metamorphic bedrock, failed to encounter ground water. One downgradient hole was drilled to 400 feet in alluvium, and encountered ground water at approximately 330 feet. This hole was completed as a monitoring well (MW-1) in May 1989. The logs of these borings are shown in this appendix.

Following the installation of MW-1, the background water quality monitoring program was instituted. The program consists of quarterly ground water sampling from the following wells:

- Monitoring Well MW-1, located approximately 2,000 feet east of the East Pit.

- Eagle Mountain School Well, located approximately 4,000 feet south of the East Pit.

- Kaiser Chuckwalla Wells No. 2 and 4, located about 5 miles east-southeast of the East Pit. Later, Kaiser Chuckwalla Well No. 3 was substituted when Well No. 2 became inoperable.

The location of these wells is shown on Figure 7.

Water samples are tested for the following parameters:

- pH, specific conductance (EC), and temperature in the field.

- Volatile organic compounds by EPA Method 524.2.

- General minerals, including TDS, alkalinity, carbonate, bicarbonate, chloride, fluoride, sulfate, nitrate, Ca, Cu, Fe, Mn, Mg, K, Na, and Zn.

- Metals by atomic absorption or induction coupled plasma analysis, including Sb, As, Ba, Be, Cd, Cr, Co, Pb, Hg, Mo, Ni, Se, Ag, Tl, and V.

- Other parameters, including chemical oxygen demand (COD), total organic carbon (TOC), total organic halides (TOX), ammonia, and cyanide.

Following four quarters of monitoring, the results of the data gathered were statistically analyzed and interpreted; results and a discussion of data were included in a report submitted to the RWQCB (SCS Engineers, 1990).

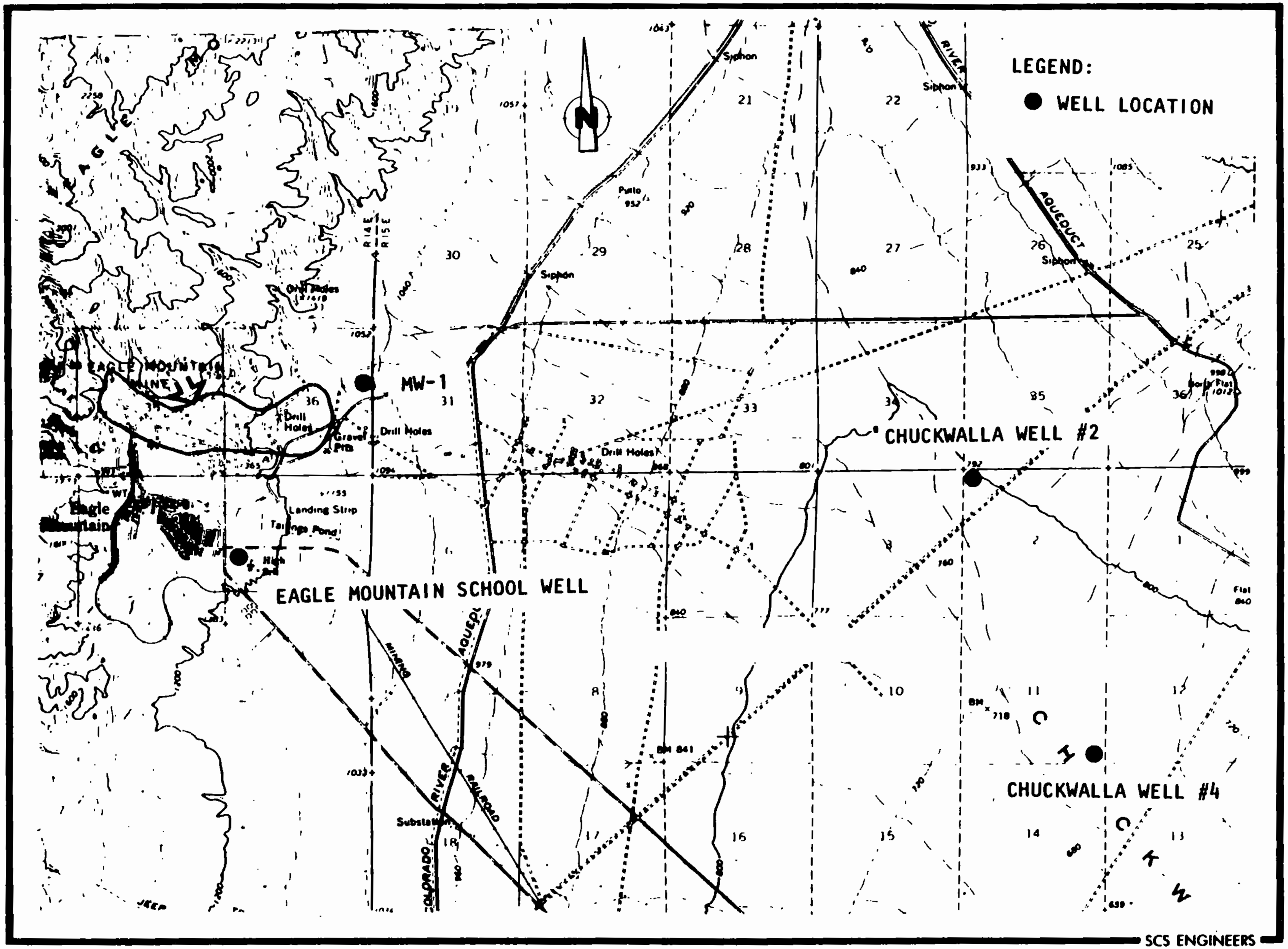


Figure 7. Background Ground Water Quality Monitoring Points.

Wells were sampled in June, September, and December 1989, and in March 1990. Water quality data indicate that the ground water is generally of the sodium sulfate type. As expected, water quality data from the two Kaiser Chuckwalla wells, located in geologically similar areas 1 to 2 miles apart, are comparable. Major ion composition of water from MW-1 is similar to that of the Chuckwalla wells; water from the Eagle Mountain School well is similar to that of the other wells in anionic composition, but contains a lower proportion of sodium and a greater proportion of calcium. These data are shown graphically on Figure 8, which indicates the major ion concentrations in the four wells.

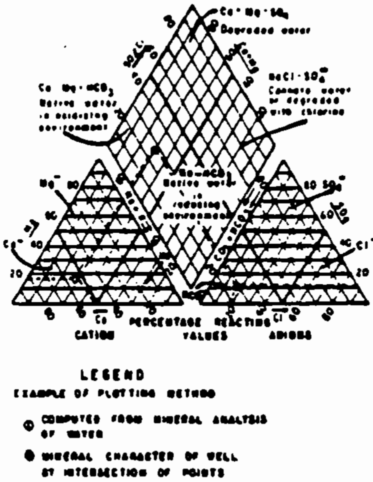
TDS content of the water ranges from 500 to 1,000 mg/l, and is highest in the Eagle Mountain School Well and lowest in MW-1. Laboratory pH ranges from 6.6 to 8.3; pH is lowest in MW-1, and highest in Kaiser Chuckwalla Well No. 4. Temperature of ground water is relatively high, with wells closest to the project site averaging nearly 32°C, and Kaiser Chuckwalla wells averaging about 30°C.

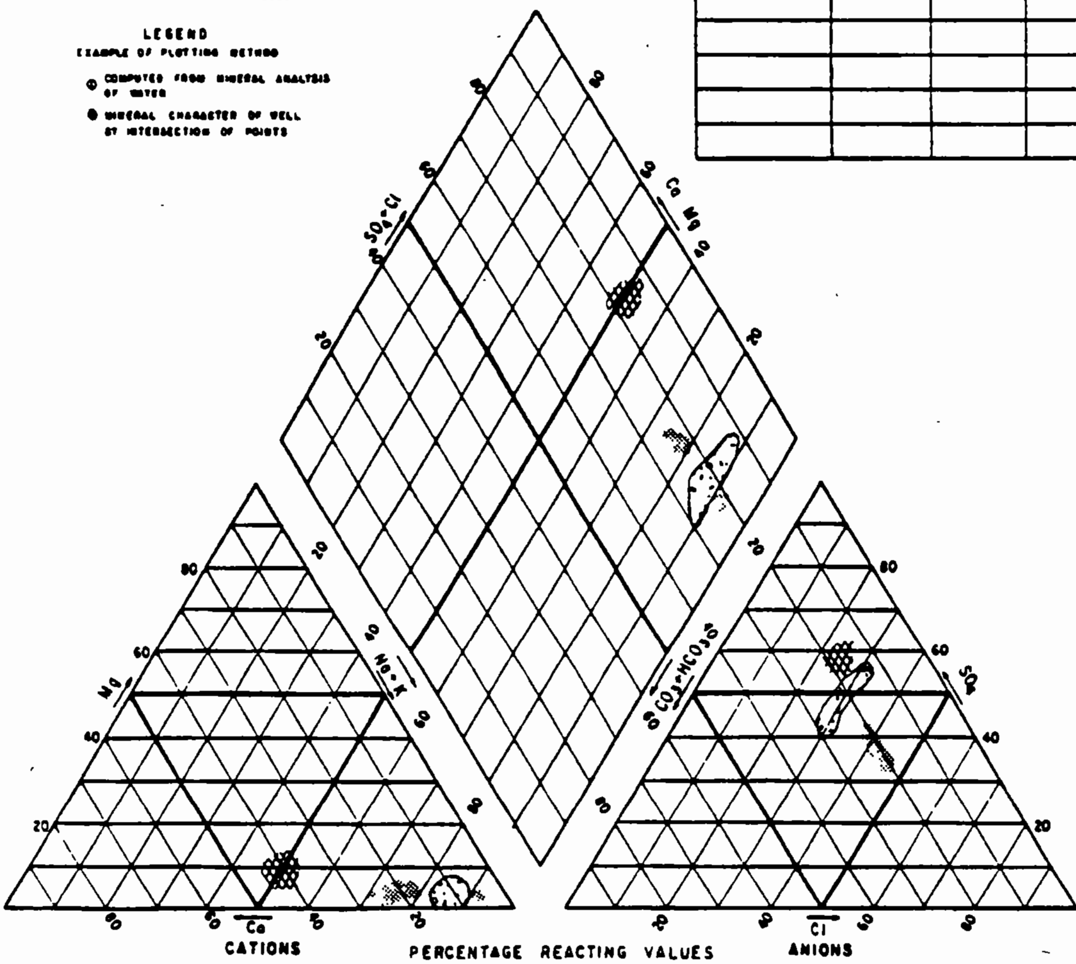
The only chemical species detected in concentrations greater than national primary drinking water standards was fluoride, which was above these limits in all wells except MW-1. Fluoride, whose presence renders much of this area's water unfit for drinking without prior treatment, ranged from 0.6 to 11 mg/kg in the four wells. Fluoride concentration was lowest in MW-1 and highest in Kaiser Chuckwalla Well No. 4.

No metals were found at concentrations above national primary drinking water standards. Measurable COD (an indication of the quantity of organic matter present) was found only in the Eagle Mountaih School Well in June 1989, and MW-1 in September. The School well had the highest concentration of TOC in June. No volatile organic compounds have been detected in any of the four wells.

Overall water quality in the four wells is not considered to be high. In addition to generally high fluoride concentration, TDS levels are all above 500 mg/l (the maximum level recommended in the national secondary drinking water standards). In addition, sulfate concentration equaled or exceeded the national secondary standard of 250 mg/l in all wells except MW-1 and Chuckwalla Well No. 4 on both sampling dates, and in Chuckwalla Well No. 4 in

WELL	SYMBOL	MEAN Fl	MEAN TDS
MW-1		0.76	566
SW		1.93	978
Chuckwalla Wells		7.7	799





SCS ENGINEERS

Figure 8. Trilinear Diagram of Ground Water Quality.

September 1989. Concentrations of iron and manganese were at or above national secondary drinking water standards in MW-1 in all samples, and the School Well in September through March. The laboratory results for these two chemical species may include suspended sediment as well as dissolved iron and manganese.

Local Water Quality--

To provide additional data on water quality in the local ground water basin, a program was instituted for sampling and analyzing water from irrigation, domestic, and other water production wells in the northwestern Chuckwalla Valley. This program was first implemented during August 1989. The data provide a supplement to background water quality data being obtained as described in the previous section.

Samples are being taken from selected wells, with the well owner's permission, for general minerals analysis. To date, nine wells have been sampled. In addition, previous water quality analyses have been obtained from published and unpublished records of the California Department of Water Resources, the Colorado River RWQCB, the Riverside County Department of Environmental Health, the U.S. Geological Survey, Kaiser Steel Resources, Inc., and other sources. Water quality analyses are summarized in Table 7; laboratory reports on recent water quality analyses have been reproduced in this appendix.

Untreated ground water in the northwestern Chuckwalla Valley is of a quality which is satisfactory for irrigating the common types of crop grown locally and for domestic uses besides drinking. Locally, ground water may contain levels of boron or sodium which are too high for irrigation of some crop species. Ground water from almost all areas of the northwestern Chuckwalla Valley contains fluoride concentrations which are above the national primary drinking water standards. These regulations specify a temperature-dependent maximum concentration of fluoride which is between 1.4 and 2.4 mg/l. This concentration is 1.4 mg/l for the air temperatures experienced in the Chuckwalla Valley. Nearly all wells in the northwestern Chuckwalla Valley yield water with greater than 1.4 mg/l of fluoride.

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA

Well	MW-1	MW-1	EM School	EM School	EM School	EM School	KS Chuck.2	KS Chuck.2
Well #	3S/14E-36H	3S/14E-36H	4S/14E-1M	4S/14E-1M	4S/14E-1M	4S/14E-1M	4S/15E-2D	4S/15E-2D
Date	9/26/89	6/15/89	9/27/89	6/15/89	9/20/88	2/8/86	9/26/89	6/15/89
pH	8	6.6	7.7	7.4	7.6	8.2	8.2	8
EC	790	970	1500	1500	1360	1321	1400	1500
TDS	510	790	1000	970	774	907	900	870
Ca	26	16	120	120	113	109	32	43
Mg	3.4	2.8	22	22	16.4	21	2.2	2.1
Na	130	221	170	149	149	160	270	270
K	4.3	5.5	6.1	3	3		4.6	4.6
Fe	1.3	13	5.6	0	0	0.08	0.03	0
HCO3	98	93	170	130	163.9	177	150	110
CO3	0	0	0	0	0	0	0	0
SO4	110	150	420	430	302	390	320	340
Cl	110	97	140	140	140	123	140	140
NO3	20	1.5	18	7.4	14.8	2.3	20	13
Fl	0.7	1.2	1.8	2	2.4	2	6.2	6.9
Hard.	79	52	390	300	348		89	118.6

Analyses in mg/l (parts per million) except for pH and EC (micromhos). If chemical species not detected in analyses it is recorded as 0 on this table. Blank spaces indicate analyses not performed.

* Data from Dept. Water Resources Bulletin 91-7.

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA (CONTINUED)

Well	KS Chuck.2	KS Chuck.4	KS Chuck.4	KS Chuck.4	Des. Utopia	Des. Utopia	Charpied	unnamed*
Well #	4S/15E-2D	4S/15E-11R	4S/15E-11R	4S/15E-11R	4S/15E-16M1	4S/15E-16M1	4S/15E-16G	4S/16E-29R
Date	9/20/88	9/26/89	6/15/89	3/21/77	1/5/82	8/24/78	8/24/89	10/5/61
pH	7.8	8.3	8.1	8.2	8.5	9	8.2	8.3
EC	1300	1200	1200	1110			930	1230
TDS	745	730	690	675	216	472	560	778
Ca	38.6	25	23	17.6	4	7.2	17	0
Mg	2.3	1.2	1.2	1.04	1	0.1	0.72	1
Na	255	230	230	208	90	152	160	274
K	2.4	3.7	3.8	3.17			2.2	4.3
Fe	0.1	0.07	0.03	0	0	0.37	0	
HCO3	143.1	160	120	130	40	2	56	290
CO3	0	0	0	0	14	2	0	18
SO4	282	240	250	218	139	154	240	165
Cl	146	110	100	96	78		110	110
NO3	17	5.3	0	4.88		12.4	2.8	6.6
Fl	6.9	9.8	11	10.2	10.2	8.8	6.6	4.4
Hard.	106	67	61.9		34	14	3	

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA (CONTINUED)

Well	Zwang*	Penfield*	Gesell	Gesell*	Gesell*	Gesell*	Palladine*	Franna*
Well #	4S/16E-30D	4S/16E-31D	4S/16E-32D	4S/16E-32D	4S/16E-32D	4S/16E-32D	4S/16E-32M	5S/15E-1L
Date	8/3/61	6/10/61	10/4/89	10/6/61	5/16/57	4/12/53	10/11/61	3/21/60
pH	8	8	8	7.1	8.2		8.2	8.7
EC	925	1060	3100	925	882	838	885	660
TDS	554	604	2000	512	523	498	508	403
Ca	17	16	150	14	12	14	12	72
Mg	1	0	13	0	1	2.9	0	10
Na	179	201	500	176	163	163	166	130
K	2.7	2.7	6.4	2	1.9		16	1.6
Fe			0.03					
HCO3	82	134	100	63	70	76	43	59
CO3	0	0	0	0	0	0	0	7
SO4	219	212	620	171	164	157	162	112
Cl	90	96	440	113	110	123	124	69
NO3	9.3	5.6	110	1.2	0.5	0	3.7	1.9
Fl	3.6	9.5	5.1	7.9	7.5		7.4	12
Hard.	45	40	370	35	33	46	30	221

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA (CONTINUED)

Well	Kanne*	Franna*	McGoo's	Lk.Tam.4	Lk.Tam.2	Ragsdale*	C.Div.Hwy.*	Ragsdale*
Well #	5S/15E-12N	5S/15E-13B	5S/15E-13C	5S/15E-14D	5S/15E-14D	5S/15E-23N	5S/15E-27B	5S/15E-27H
Date	5/18/61	6/18/61	9/11/89	9/12/89	9/12/89	6/10/61	5/10/58	9/5/58
pH	7.9	7.8	7.9	8.2	8	8.1	7.8	8.1
EC	720	1560	1700	730	1300	2100	763	3270
TDS	406	514	950	430	760	1150	486	2060
Ca	14	49	45	14	34	62	28	159
Mg	0	5	5.2	0.31	0.95	4	3	19
Na	129	251	280	130	230	350	131	446
K	2.7	5.5	5.9	2.9	3.3	13	6.5	22
Fe			0	0.04	0			
HCO3	88	67	76	110	100	76	135	75
CO3	0	0	0	0	0	0	0	0
SO4	115	128	140	120	200	154	117	274
Cl	74	351	380	75	180	503	100	809
NO3	8.7	6.8	5.6	4.8	34	8.7	0.6	6
Fl	8.7	6.8	5.1	7.5	8.4	4.8	2.2	6
Hard.	35	143	131	36.3	88.9	170	84	497

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA (CONTINUED)

Well	Ragsdale*	Ragsdale*	Hancock*	Hancock*	Carney*	Carney*	Carney*	Carney*
Well #	5S/15E-27H	5S/15E-27H	5S/15E-29F	5S/15E-29F	5S/16E-5B1	5S/16E-5B1	5S/16E-5B1	5S/16E-5B1
Date	5/25/55	5/25/52	10/11/61	5/10/58	5/16/61	5/10/58	5/25/55	5/21/52
pH	7.8	8	8	7.8	7.9	7.5	8.6	8
EC	2980	2380	433	450	865	861	837	957
TDS	1810	1560	252	288	479	533	505	514
Ca	153	96	12	15	16	14	15	15
Mg	10	7	2	0	0	1	2	1.6
Na	480	410	82	88	161	167	165	168
K	16	16	2.3	2.8	3.1	3.9	3.2	
Fe								
HCO3	68	66	204	229	107	120	98	112
CO3	0	0	0	0	0	0	14	0
SO4	243	160	9	7	147	154	148	128
Cl	840	702	14	25	94	108	88	78
NO3	13	4.9	25	15	12	0.1	6	6.2
Fl	6		3.9	1.4	7	2.2	12	35
Hard.	423	269	40	39	40	39	46	45

TABLE 7: CHUCKWALLA BASIN WATER QUALITY DATA (CONTINUED)

Well	Peterson*	Brown*	Airport*	Airport*	Airport*	Aljoba S	Aljoba S*	unnamed*	Harmon*
Well #	5S/16E-6N	5S/16E-7M2	5S/16E-8F	5S/16E-8F	5S/16E-8F	5S/16E-18M	5S/16E-18M	5S/16E-22N	5S/16E-25H
Date	5/17/61	11/7/61	5/10/58	9/17/54	5/21/52	9/12/89	11/7/61	9/12/61	5/10/58
pH	7.9	8.7	8	8.4	8.3	8.7	8.4	8	7.9
EC	618	717	787	788	770	710	753	2410	1220
TDS	362	409	512	474	478	420	453	1340	739
Ca	6	6	10	12	7.2	4.7	64	72	40
Mg	2	0	1		1.1	0.03	0	0	2
Na	126	143	155	151	162	150	149	409	198
K	1.6	1.6	2.8	2.4		1		4.7	6.1
Fe						0			
HCO3	67	55	105	104	104	89	73	21	92
CO3	0	12	0	2	1	0	7	0	0
SO4	106	106	144	132	135	110	120	144	120
Cl	74	89	95	81	88	73	85	645	248
NO3	6.8	1.9	1.5	7.1	3.7	13	11	5.6	3.7
Fl	11	6.9	2.2	1.6	13	7.8	9	3.1	5
Hard.	23	15	30	30	22	12	160	160	110

TABLE 8. CHEMICAL CHARACTERISTICS OF LEACHATE

Constituent	Range* (mg/l)	Range‡ (mg/l)	Range# (mg/l)	Leachate** Fresh	Leachate** Old
Chloride (Cl)	34 - 2,800	100 - 2,400	600 - 800	742	197
Iron (Fe)	0.2 - 5,500	200 - 1,700	210 - 325	500	1.5
Manganese (Mn)	0.06 - 1,400	--	75 - 125	49	--
Zinc (Zn)	0 - 1,000	1 - 135	10 - 30	45	0.16
Magnesium (Mg)	16.5 - 15,600	--	160 - 250	277	81
Calcium (Ca)	5 - 4,080	--	900 - 1,700	2,136	254
Potassium (K)	2.8 - 3,770	--	295 - 310	--	--
Sodium (Na)	0 - 7,700	100 - 3,800	450 - 500	--	--
Phosphate (P)	0 - 154	5 - 130	--	7.35	4.96
Copper (Cu)	0 - 9.9	--	0.5	0.5	0.1
Lead (Pb)	0 - 5.0	--	1.6	--	--
Cadmium (Cd)	--	--	0.4	--	--
Sulfate (SO_4)	1 - 1,826	25 - 500	400 - 650	--	--
Total N	0 - 1,416	20 - 500	--	989	7.51
Conductivity (umhos)	--	--	6,000 - 9,000	9,200	1,400
TDS	0 - 42,276	--	10,000 - 14,000	12,620	1,144
TSS	6 - 2,685	--	100 - 700	327	266
pH	3.7 - 8.5	4.0 - 8.5	5.2 - 6.4	5.2	7.3
Alk. as $CaCO_3$	0 - 20,850	--	800 - 4,000	--	--
Hardness, Total	0 - 22,800	200 - 5,250	3,500 - 5,000	--	--
BOD_5	9 - 54,610	--	7,500 - 10,000	14,950	--
COD	0 - 89,520	100 - 51,000	16,000 - 22,000	22,650	81

* Office of Solid Waste Management Programs, Hazardous Waste Management Division. An environmental assessment of potential gas and leachate problems at land disposal sites. Environmental Protection Agency Publication SW-110 (Cincinnati), U.S. Environmental Protection Agency, 1973. 33 pp. (Open-file report, restricted distribution.)

‡ Steiner, R. C., A. A. Fungaroli, R. J. Schoenberger, and P. W. Purdom. Criteria for sanitary landfill development. Public Works, 102(2):77-79, March 1971.

\# Gas and leachate from land disposal of municipal solid waste; summary report. Cincinnati, U.S. Environmental Protection Agency, Municipal Environmental Research Laboratory, 1975. (In preparation.)

** Brunner, D. R., and R. A. Carnes. Characteristics of percolate of solid and hazardous waste deposits. Presented at American Water Works Association 94th Annual Conference, June 17, 1974. Boston, Massachusetts. 23 pp.

Other dissolved constituents of the local ground water, including trace elements, are generally below the maximum acceptable levels specified in the primary drinking water standards. However, even ignoring elevated levels of fluoride, water quality in the northwestern Chuckwalla Valley is relatively poor for drinking purposes. TDS concentrations, which were found to range from 430 to 2,500 mg/l in recent water analyses, average about 880 mg/l. Water with TDS concentrations between 500 and 1,000 mg/l is considered to be of marginal quality for drinking. In addition, the sulfate content of Chuckwalla Valley water is relatively high (average about 240 mg/l). Sulfate in water can impart a bitter taste, and, for those not accustomed to drinking it, water high in sulfate salts can act as a laxative.

There are several differences in water chemistry between wells tapping the alluvial aquifer, and those completed in bedrock aquifers. Water sampled from bedrock in the vicinity of the Eagle Mountain mine has TDS generally above 950 mg/l, while alluvial water is generally below this level in the vicinity of the project site. Bedrock water tends to be proportionately higher in calcium, magnesium, and sulfate, and is lower in sodium. Fluoride concentrations tend to be lower in wells located near the mine area than those located closer to the central axis of the northwestern Chuckwalla Valley; however, this does not differentiate bedrock from alluvial water. Temperature of water produced from bedrock wells tends to be slightly higher than that of water from alluvial wells, although all ground water from the northwestern Chuckwalla Valley is relatively high in temperature. These differences in water chemistry may indicate that the source of bedrock and alluvial water differs, and that there is only limited communication between ground water from the two sources.

Information on the spatial distribution of water quality measurements is provided in Figure 9.

Occurrence and Movement of Ground Water--

Depth to ground water in the northwestern Chuckwalla Valley has been measured from 501 feet below ground level in the Eagle Mountain School Well to as shallow as 60 feet in the Desert Center Airport area. Water level elevations range from an estimated 800 feet above MSL at the boundary between the Chuckwalla Valley and the Pinto Basin, to below 500 feet MSL in the airport area.

A regional contour map of the upper surface of ground water is presented in Figure 10. Generalized ground water flow directions are indicated on the map by arrows. Ground water flow is generally from the margins of the valley towards the center of the valley, and from north-northwest to south-southeast within the valley. As one approaches the Desert Center area, flow direction shifts to a more easterly direction.

Ground water gradient is estimated from the map to average about 0.01 foot/foot (or cm/cm) in the area between the East Pit and the Kaiser Chuckwalla wells. Average permeability (hydraulic conductivity) of the water-bearing valley alluvium can be estimated to be 1 x 10^{-2} cm/sec (slightly greater than the average permeability estimated at the Chuckwalla wells). An estimate of 1 x 10^{-2} cm/sec is within the range one would expect for this aquifer, based on grain size and textural characteristics. Porosity of the alluvium is estimated at 35 percent. Given these assumptions, the average net velocity of water moving laterally through the alluvial aquifer can be calculated by multiplying the hydraulic conductivity by the gradient and dividing by the porosity. The result is a velocity of about 3 x 10^{-4} cm/sec, or about 300 feet (90 meters) per year. Actual velocity in the Eagle Mountain project area itself is probably less because of a locally flatter ground water gradient.

Direction of ground water movement within granitic and metamorphic bedrock beyond the immediate vicinity of the East Pit cannot be accurately estimated with data currently available, although it probably conforms approximately to surface drainage patterns. The permeability of the unfractured bedrock is very low, and bedrock fractures most likely control the movement of water. Permeability has been estimated at 1.8 x 10^{-3} cm/sec for the Eagle Mountain School well, and at 1.5 x 10^{-5} cm/sec for bedrock monitoring well MW-3. Permeability of bedrock exposed at the surface of the western portion of the East Pit was calculated, based on the infiltration rate of ponded rain water as 3.8 x 10^{-5} cm/sec. Porosities of bedrock are difficult to estimate, but are expected to be in the range of 1 to 10 percent.

ENVIRONMENTAL IMPACTS

Surface Water

During operation of the proposed landfill, contaminated surface waters could result from the contact of surface water with uncovered refuse. Potential sources of water would be direct precipitation, run-on from surrounding slopes, and run-on of floodwaters from Eagle Creek. Prior to the filling of the East Pit to surrounding grade, surface waters which might enter the landfill would not run off, but would be diverted in the landfill so as to avoid contact with refuse. (The final landfill surface will be above the present East Pit rim.) A final cover, including a low-permeability layer that will separate surface water from the refuse, will be placed.

The impact of the proposed landfill on surface waters is not expected to be significant. Due to the limited precipitation in the area, and with the implementation of the planned landfill drainage and cover provisions, it is anticipated that impacts on downstream surface water from the proposed landfill will be insignificant. Mitigation measures recommended for the drainage system are described in the section on Drainage.

The Metropolitan Water District of Southern California (MWD), which operates the Colorado River Aqueduct that crosses the Chuckwalla Valley, has expressed concern that windblown litter from the landfill could be deposited on uncovered portions of the aqueduct. The nearest uncovered portion of the aqueduct is approximately 4,000 feet east from the nearest part of the proposed landfill. Due to the distance involved, it is expected that only minute quantities of windblown material could be deposited in the aqueduct. Landfill operations will include a litter control program to ensure that refuse is promptly incorporated into the working face of the landfill to limit the opportunity for litter formation, and will also feature the periodic collection of litter by site personnel.

Ground Water

Leachate Production--

When water comes in contact with solid waste, leachate can be produced. Leachate is created when water, regardless of its source, moves through refuse fill and mobilizes substances contained in the fill. Leachate is typically a solution containing dissolved or finely suspended solid matter, dissolved organic waste, and end products of microbial decomposition. Landfill leachate is basically a wastewater characterized by non-neutral pH, high BOD and COD, and relatively high concentrations of dissolved inorganic substances, possibly including heavy metals. Compositional analyses for some leachates are shown in Table 8. A main concern at any landfill is the generation of leachate and the potential for migration of leachate from the landfill, with consequent degradation of local ground water.

If the capacity of the refuse fill to retain water (field capacity) is exceeded, water may be discharged into adjacent materials. If these materials are sufficiently permeable so that they are capable of transmitting significant quantities of fluids, migration of leachate to usable ground water can occur.

For any leachate migration to occur, moisture in the landfill must exceed the field capacity of the refuse fill. Potential sources of water in the refuse include:

- The intrinsic moisture content of the refuse.
- Infiltration of direct precipitation and of uncontrolled surface water run-on.
- Water produced by the microbiological reactions that occur during anaerobic decomposition of the buried refuse.
- Infiltration of ground water into refuse.

These potential sources are discussed below.

The physical characteristics of the incoming refuse can have a significant influence on leachate composition and production. Municipal solid waste typically has a moisture content of about 25 percent. The refuse coming into the Eagle Mountain site will have undergone sorting to remove recyclable materials at transfer stations near refuse sources, and will have been compacted for placement in shipping containers. No free liquid will be accepted as incoming refuse. Sorting activities will provide an opportunity to remove containers of liquid waste improperly contained in the solid waste stream. The removal of compostable yard waste and other high-moisture wastes would further reduce the overall moisture content of the refuse. The hot, dry climate of the area will result in evaporation of significant quantities of water from the refuse during and after work at the active face. Compaction and incidental drying of refuse during handling could further reduce the original moisture content.

The addition of water to the landfilled refuse from direct precipitation at Eagle Mountain is expected to be minimal, due to the arid climate. The average rainfall is approximately 3 inches per year. Considerably more moisture will probably be lost from the refuse through evaporation (pan evaporation measured by Kaiser at approximately 155 inches per year) than is added through direct precipitation, since it is expected that the refuse will be exposed to some drying influence under a layer of daily cover for some time.

Uncontrolled run-on to the landfill is also expected to be minimal. Drainage in the area surrounding the landfill will be subject to engineering controls. These controls are expected to greatly reduce or eliminate run-on.

Accumulation of moisture generated during anaerobic decomposition is expected to be small. Slight or no water is normally generated during anaerobic decomposition. Microbial decomposition rates are expected to be low as well.

Direct infiltration of ground water into the refuse fill could, in theory, provide a source of water for leachate generation. Infiltration of ground water could be expected only if the upper level of ground water reaches an elevation greater than the lowest level of refuse. This is considered unlikely because refuse will not be placed within 50 feet of the highest historically known level achieved by ground water.

The phasing plan for the landfill avoids disposal in the part of the East Pit which currently contains water. Prior to initiating operations in this part of the pit, the bottom of the pit will be raised by filling this area with coarse tailing material to an elevation at least 50 feet higher than the highest historically known ground water level. This degree of separation between historic ground water levels and the lowest elevation where landfilling will occur is anticipated to mitigate this potential impact to levels of insignificance.

Volumes of leachate from all sources within the landfill are expected to be small, and would be controlled by the leachate collection system to be installed at the site.

Potential Leachate Flow Paths--

The opportunity for migration of leachate from the landfill could result from water content reaching field capacity within the refuse. If leachate is not pumped from the landfill, the accumulation of fluids can result in the saturation of the landfill liner. Once the liner becomes saturated and a sufficient fluid head is applied, leachate could move through the liner. Even if this were to occur, the volume of leachate penetration through time is expected to be very low. Conceptual landfill design has involved application of computer models to determine leachate generation volumes.

If leachate were to escape from the landfill, it would encounter either bedrock or older alluvium, depending on which portion of the landfill leaked. The intergranular permeability of the bedrock underlying the East Pit is very low, on the order of 1×10^{-9} to 1×10^{-11} cm/sec based on lithology. Extensive fracturing of this type of material, however, may increase the net permeability to the range of 1×10^{-3} to 1×10^{-6} cm/sec. Alluvial permeability in the neighborhood of 1×10^{-2} cm/sec can be estimated from pump test data at Kaiser's Chuckwalla wells and published data. Bedrock permeability has been estimated at close to 1×10^{-3} cm/sec at the Eagle Mountain School well.

If leachate leakage were to occur, earliest leakage would be most likely at the lowest portion of the landfill to be initially filled. Located in the western portion of the East Pit, this portion of the landfill is underlain by bedrock, as is most of the pit. Any leakage in this area would initially affect bedrock. Ground water is located approximately 300 feet below this area. Ground water gradient appears to slope easterly under the western portions of the East Pit, and may slope westerly under the eastern portions of the pit. Any leakage of leachate from the landfill would tend to move towards the central part of the pit, to the area of the East Pit pond.

Geological mapping of the East Pit area reveals a general pattern of two major sets of bedrock joints (planar fractures). As shown in Figure 11, these trend approximately north-northwest/south-southeast (N40°W), and east/west (N80°W). Because of the easterly ground water gradient, net movement of a leachate plume through fractures would be expected also to be in an easterly direction.

The lateral distance from the easternmost portion of the initial fill area eastward to the nearest alluvium is approximately 4,500 feet. For the purpose of calculating a maximum expected flow velocity, we have assumed that potential leachate movement will be through bedrock fractures with an effective permeability averaging 1×10^{-3} cm/sec (a high value for rocks of this type). If the ground water gradient averages 0.01 and the porosity of fractured bedrock is 10 percent (see subsection on the Occurrence and Movement of Ground Water), the resulting flow velocity is 1×10^{-4} cm/sec, or about 100 feet per year (30 meters per year). This indicates that ground water affected by leachate leaking from the portion of the site first filled could possibly move into the alluvium in 45 years, if ground water flows directly east (note that these numbers do not take into account the attenuation of contaminant movement which commonly occurs due to absorption and desorption of dissolved substances on the surface of geologic materials through which ground water travels; these effects would tend to slow the movement of contaminants).

Based on recently installed ground water monitoring wells, and on information obtained at the East Pit pond, it appears that there is a reversal of the generally eastward-sloping potentiometric surface of the ground water in the vicinity of the East Pit (Figure 12). Excavation of the central portion of the pit to a depth below the upper surface of the ground water and ground water discharge at this point most likely has resulted in a depression in the potentiometric surface. As a result, the ground water surface slopes westward under portions of the eastern half of the pit. The fact that the gradient

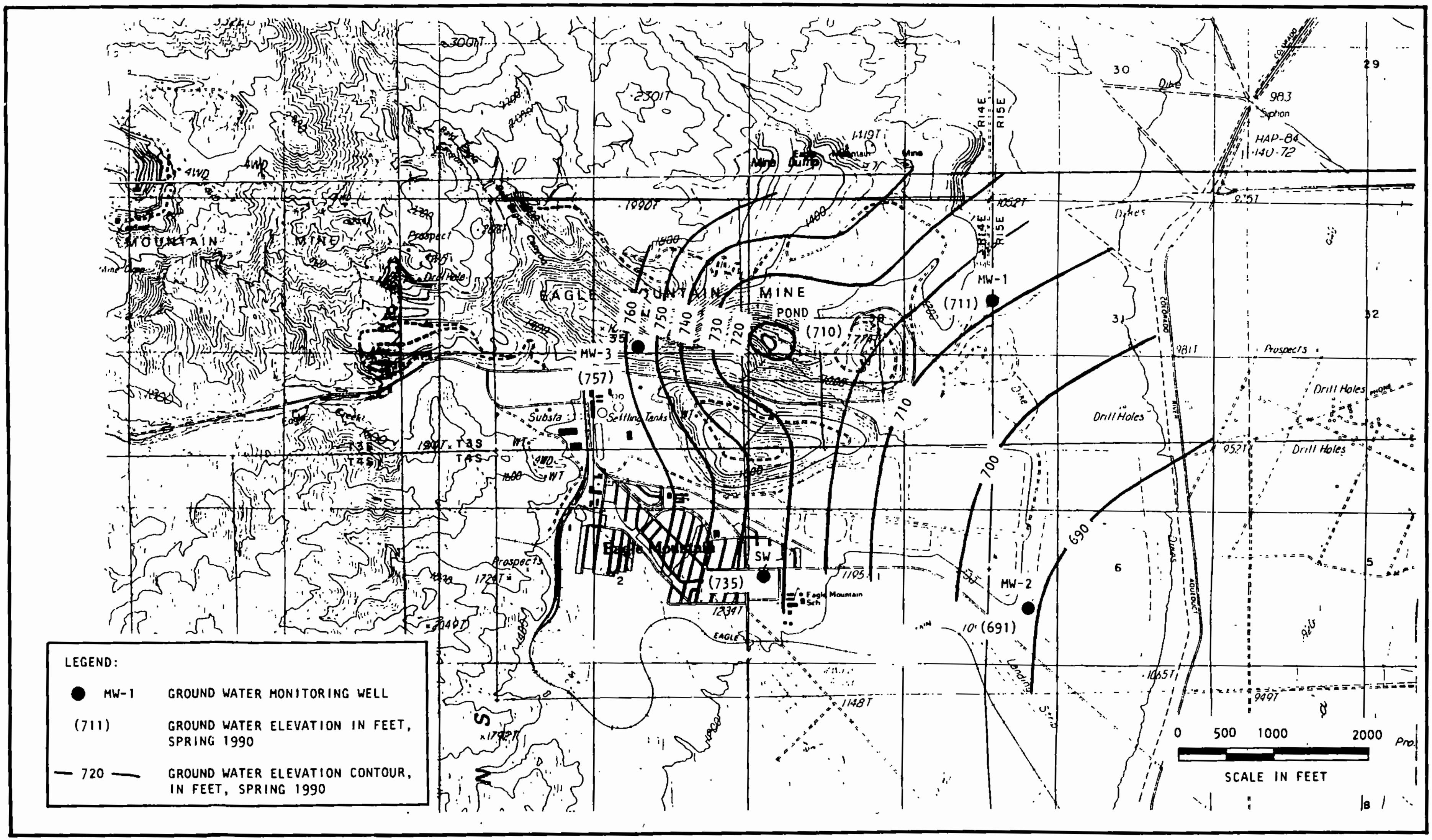


Figure 12. Ground Water Surface Elevations in the Vicinity of the East Pit.

reversal occurs near the alluvium/bedrock interface suggests that communication between alluvial and bedrock aquifers is limited.

Low recharge rates following bailing or pumping in both MW-1 and MW-2 suggest low permeability of at least some alluvial sediments in the area near the margin of the Chuckwalla Valley. This could be due to the presence of debris flow or other relatively low-permeability deposits near the mouth of Eagle Creek Canyon. In situ aquifer testing at MW-2 indicates that permeabilities may be as low as 7×10^{-6} cm/sec. Low-permeability deposits may be acting to limit communication between bedrock aquifer in the mine area and more permeable portions of the alluvial aquifer found further to the east, thus facilitating the formation of a ground water divide near the bedrock/alluvium interface.

Based on relative permeabilities, the movement of ground water is expected to be more rapid in alluvium in the central Chuckwalla Valley area than in fractured bedrock. As indicated in the section describing the Occurrence and Movement of Ground Water, flow rates of 300 feet per year could occur, although the movement of a contaminant plume would be somewhat slower due to the adsorption of contaminants on the surface of sediment grains. Along with adsorption and diffusion, the dilution of leachate-affected water by ground water already residing in the alluvium would tend to reduce the concentration of contaminants.

The escape of significant quantities of leachate from the landfill is considered unlikely, since the landfill will be lined with a layer of low-permeability soil as required by the appropriate permitting agency. In addition, leachate which accumulates at the base of the landfill will be collected and pumped out of the landfill for treatment and disposal.

If escape of leachate from the facility occurred, it could impact ground water; however, the travel of leachate-affected ground water is expected to be towards the East Pit pond area, and not towards the alluvial aquifer in the Chuckwalla Valley. This movement is expected to be relatively slow. Presently available data on the permeability of fractured bedrock, and on the ground water gradient, indicate that movement of leachate-affected ground water would be at a rate of no more than approximately 100 feet per year.

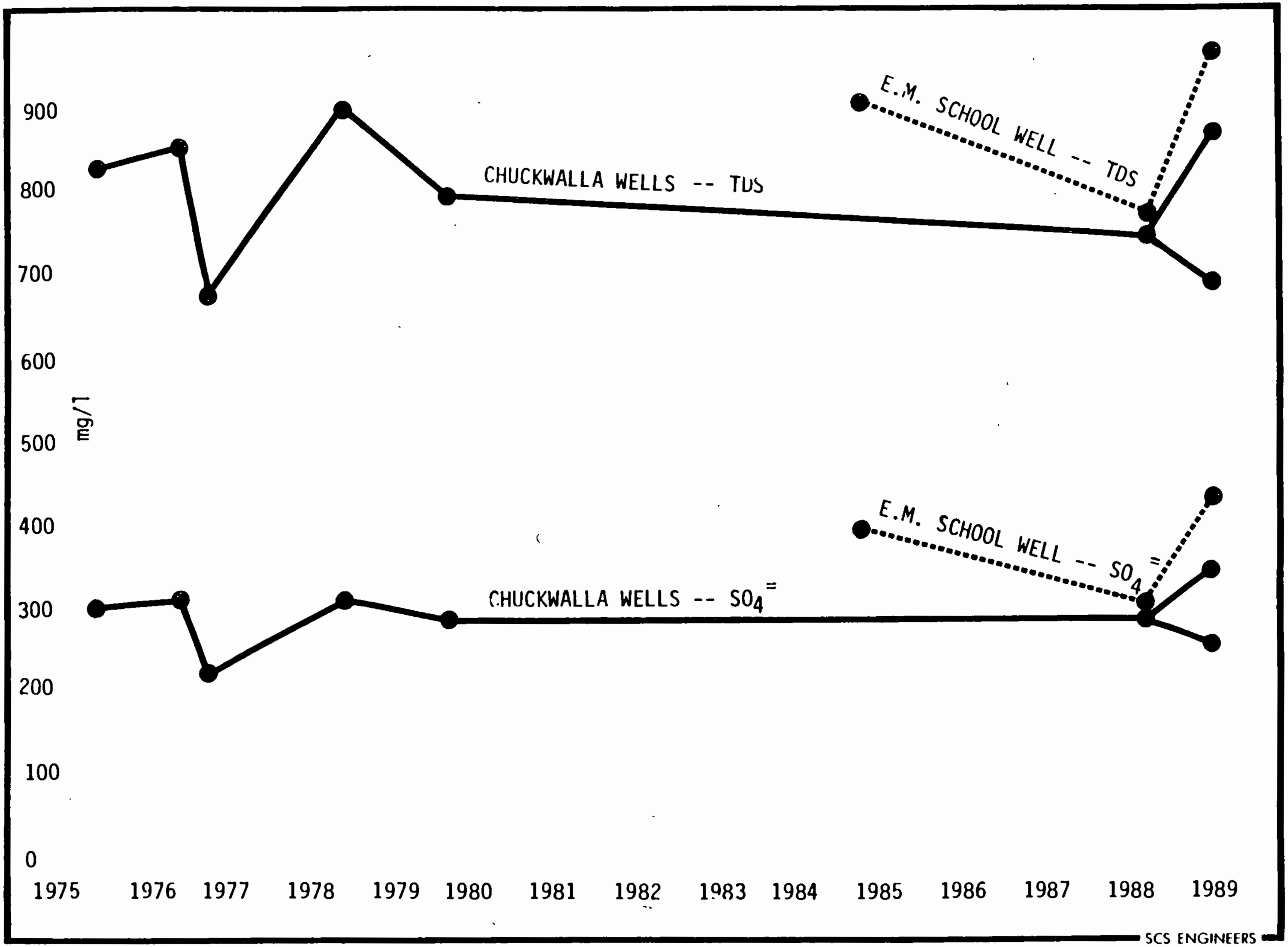


Figure 13. Change in Concentration of Total Dissolved Solids (TDS) and Sulfate Ion With Time, Chuckwalla Wells and Eagle Mountain School Well.

The impact of landfill leachate on usable ground water is not expected to be significant because of the relatively small quantities of leachate that will be generated in this landfill, because of planned engineering controls such as a low-permeability liner and leachate collection system, because of the isolation of the site from areas of beneficially used ground water, and because of the limited communication between bedrock and alluvial ground water.

CUMULATIVE IMPACTS

Surface Water Quality

Cumulative impacts on surface water quality are not expected from this project.

Ground Water Quality

Cumulative impacts of the proposed landfill and anticipated mining operations on ground water quality are not considered to pose a significant threat to ground water quality.

Iron mining is one of the mining options being considered. Wet processing of ore will probably not take place; however, if it did, disposal of mine process water could conceivably affect ground water in the Chuckwalla Valley. Water quality data indicate that no significant change in water quality in the wells nearest the mine (Chuckwalla and Eagle Mountain School Wells) occurred during and following the previous years of mine operation. Figure 13 indicates in graphical form the changes in TDS and sulfate concentrations during this period. No discernable trend of change in water quality can be seen from these graphs. No significant cumulative impacts to water quality are expected from possible future iron mining activities.

Future landfill leachate management operations may involve construction of a leachate pretreatment plant. Effluent from the pretreatment plant would be conveyed to the existing Eagle Mountain wastewater treatment works. No cumulative impact to water quality is expected to occur from this aspect of operations, because the effluent from the pretreatment plant is not expected to be lower quality water than that presently being delivered to the Eagle Mountain wastewater treatment works.

MITIGATION MEASURES

Measures Incorporated into Project Design

Ground Water Monitoring--

To provide ongoing ground water monitoring during landfill operations and following landfill closure, a system of detection monitoring wells will be installed. This system will be designed to detect movement of contaminants from the area of the landfill in ground water. For this purpose, wells are generally placed downgradient close to the margin of the landfill. Water quality at these points of compliance is compared to background water quality. California Administrative Code, Title 23, Subchapter 15, regulations specify that a sufficient number of wells be installed to monitor background water quality and water quality at points of compliance. The wells must be logged by a geologist, and must be able to accurately monitor water level and chemical indicator parameters. Prior to installation of the ground water monitoring system, approval of the proposed program will be obtained from the RWQCB.

At present, three dedicated monitoring wells (MW-1, MW-2, and MW-3) exist in close proximity to the area proposed for landfilling. These wells will be supplemented by other ground water monitoring wells located downgradient of the landfill. Due to the size and configuration of the landfill, it is anticipated that a minimum of four to six downgradient wells will initially be monitored. In addition, at least one ground water monitoring well will be constructed upgradient of the landfill, so that water quality can be measured in an area beyond the potential effect of the landfill. The location of wells will be determined during the permitting stages of landfill design, subject to approval by the RWQCB.

Construction methods and details of the ground water monitoring wells will be approved by the RWQCB. Alluvial wells will probably be drilled using air or mud rotary methods. The bedrock wells will probably be drilled using air rotary methods in conjunction with a downhole percussive tool. Samples will be collected during drilling to provide information on lithology. A log of each well will be prepared by an on-site geologist working under the direct supervision of a geologist registered in the State of California. The well log will include information on well location, driller, drilling equipment, borehole diameter, depth, dates and times that various operations were performed, and geological observations.

The wells will be sampled and analyses regularly performed as specified by the RWQCB in their Waste Discharge Requirements. It is anticipated that laboratory analyses will consist of a number of tests selected from among the ones being performed for background ground water monitoring (described in the subsection on Background Ground Water Quality Monitoring).

Landfill Liner--

Landfill design will incorporate a liner consisting of recompacted tailing material from the fine tailing basins located on site. This material is primarily fine-grained material consisting of silt- and clay-sized particles with some sand-sized particles.

When compacted to 90 percent of maximum density, the on-site fine tailing material displays permeabilities ranging from 8.8×10^{-6} to 3.0×10^{-7} cm/sec. The addition of small quantities of sodium bentonite clay to the material has been found to decrease permeability by one to two orders of magnitude. Quality control testing will be performed during liner placement to ensure that only material with permeabilities acceptable to the RWQCB is used for liner. If necessary, bentonite or other material may be added to decrease natural permeability. Other physical properties of the tailings material are consistent with its use as a landfill liner, and no hazardous concentrations of metals or other substances were found to be contained in the material. Additional laboratory test data on the tailings pond material are found in this appendix.

Drainage Control--

Landfill design will include a drainage control system which will prevent run-on of surface water. The drainage system is fully described in the section on

Drainage. Minimization of run-on will decrease the water available for leachate production in the landfill, and will therefore reduce the opportunity for leachate migration from the landfill.

Leachate Collection System--

Landfill design will include a leachate collection system to allow removal of accumulated leachate from the lower portions of the refuse. By minimizing the quantity of leachate which accumulates in the landfill, the operator will minimize the opportunity for leakage of significant quantities of leachate.

Landfill Cover--

The entry of moisture to the refuse will be further inhibited by a final cover which includes a low-permeability layer placed over completed sections of the landfill. Final cover design specified in Subchapter 15 regulations consists of several layers of soil designed and constructed to minimize percolation of precipitation moisture through refuse. The lowest layer consists of a minimum of 2 feet of compacted foundation material; above this, a minimum 1-foot-thick layer of compacted soil is emplaced, with a permeability equal to or less than the landfill liner; the top of the final cover, a layer consisting of not less than 1 foot of clean soil, is designed to support vegetative growth.

An intermediate cover will be placed over those sections of the landfill which are expected to remain inactive for extended periods of time. Intermediate cover will be designed and constructed to minimize the percolation of precipitation through refuse.

LFG Control System--

Migrating LFG which contains volatile organic compounds can be a significant source of ground water contamination, if uncontrolled. In addition, carbon dioxide in LFG can dissolve in ground water and result in lowered pH which could, in turn, mobilize metal ions.

These sources of potential ground water degradation will be controlled by recovering LFG from the landfill. By preventing the buildup of LFG, the driving force behind gas migration will be removed. The LFG control and recovery systems are described more fully in Section II.A and Appendix A. Additional controls on LFG migration will be provided by the low-permeability landfill liner, which will minimize lateral migration of gas.

Control of Windblown Litter--

The potential for windblown litter to enter the Colorado River Aqueduct through its uncovered portions, and impact the quality of water in the aqueduct, will be mitigated by a litter control program which consists of the following:

- Incorporation of refuse into the working face of the landfill as rapidly as practicable to reduce the opportunity for the spread of litter.

- Regular litter pickup by landfill personnel to control the spread of litter within the landfill, and to prevent litter from spreading beyond the project boundaries.

Phasing--

It is possible that if the lowest portion of the landfill were to extend below the projected water table, ground water pressure at significant head on the outside of the liner could cause liner failure and subsequent entry of ground water into the landfill. As a mitigation measure to prevent this possibility, refuse will not be placed at a level at or below the highest historically known ground water level.

The lowest point in the present East Pit excavation exists at an elevation of approximately 705 feet MSL. When the central portion of the East Pit is scheduled to be filled, this level will be raised substantially by filling the lowest portion of the East Pit with coarse tailing material. The phasing plan for the landfill avoids disposal in the deepest part of the East Pit for some 60 to 65 years. Prior to initiating operations in this part of the pit, the bottom of the pit will be raised substantially by filling this area with coarse tailing or other suitable material to an elevation higher than the highest historically known ground water level. This separation between historic ground water levels and the lowest elevation where landfilling will occur, and installation of a leachate control and monitoring system will mitigate the potential for liner failure to levels of insignificance. Between the start of operations and the filling of central portions of the East Pit, additional studies to determine ground water hydrology, movement characteristics, and other parameters will be performed; prior to the filling of these portions of the pit, measures will be taken (such as installation of dewatering wells) to maintain the westward ground water gradient in the eastern portion of the pit.

REFERENCES

California Department of Water Resources. 1979. Sources of Powerplant Cooling Water in the Desert Area of Southern California. DWR Bull. 91-24.

Dubois, R. L., and R. W. Brummett. 1968. Geology of the Eagle Mountain Mine Area, in Ore Deposits of the United States, 1933-1967, J. D. Ridge, ed., Am. Inst. Min. Met. Eng, V. 2, Chapter 76, 1592-1606.

Giessner, F. W. 1963. Data on Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California. Calif. Dept. Water Resources Bull., 91-7.

Hawke Engineers. 1973 (August 28). Letter Report to Colorado River Basin RWQCB.

Koehler, J. H., and M. J. Mallory. 1981. Addendum to Sources of Power plant Cooling Water in the Desert Area of Southern California, U.S. Geol. Survey Open File Report 81-527.

Mann, J. F., Jr. 1986. Ground Water Conditions in the Eagle Mountain Area. Report to Kaiser Steel Corporation.

SCS Engineers. 1988 (October). Background Water Quality Monitoring Plan, Eagle Mountain Iron Mine, Riverside County, California.

SCS Engineers. 1989a (September). First Quarterly Background Ground Water Quality Report, Eagle Mountain.

SCS Engineers. 1989b (December). Second Quarterly Background Ground Water Quality Report, Eagle Mountain.

SCS Engineers. 1989c (December 22). Memo to Mine Reclamation Corporation (Subject: Calculations of Aquifer Parameters Based on Available Data).

SCS Engineers. 1990 (May). Background Ground Water Quality Monitoring Program, Eagle Mountain.

APPENDIX

BORING LOG

SCS ENGINEERS
Environmental Engineers
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807 - 3315
(213) 426 - 9544
FAX (213) 427 - 0805

PROJECT: EAGLE MOUNTAIN

LOCATION:

JOB NUMBER: 0187073.03

GEOLOGIST / ENGINEER: B. GARBACCIO / K. LISTER

DRILLER: PIONEER

DRILL RIG: FAILING F 8

DRILLING METHOD: MUD ROTARY

HOLE / WELL #: M W - 1

DIAMETER: 10"

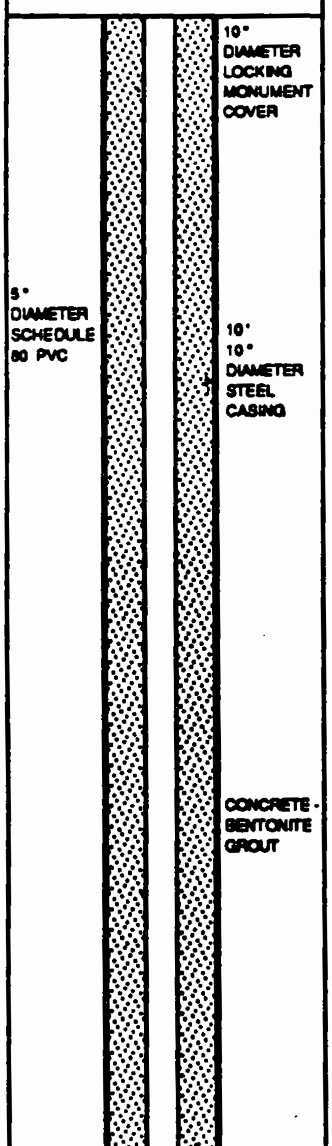
TOTAL DEPTH: 400'

DATE STARTED: APRIL 27, 1989

DATE COMPLETED: MAY 16, 1989

SAMPLING DEVICE: ———

COMPLETION DETAIL



DEPTH (FEET)	SAMPLE	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
0					DIRECT AIR ROTARY USED TO SET STEEL CASING
1					
2					
3					
4					LIGHT TAN SILTY FINE TO VERY COARSE SAND WITH 25% GRAVEL TO 2" (BOULDERS > 1 FOOT OBSERVED IN BOREHOLE) GRAVEL IS MOSTLY GRANITE WITH EPIDOTE, VEIN QUARTZ AND MINOR MAGNETITE - HEMATITE ORE
5					
6					
7					
8					
9					
10					
11					
12					MUD ROTARY
13					MUD REMOVES FINES
14					
15					
16					
17					
18					
19					
20					

BORING LOG

PROJECT : EAGLE MOUNTAIN
JOB NUMBER: 0187073.03

HOLE / WELL #: MW-1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
25						
30						
35						
40		5" DIAMETER SCHEDULE 80 PVC				
45						
50						
55		CONCRETE - BENTONITE GROUT				
60						60' - 80' LESS GRAVEL THAN UPPER SECTION
65						
70						
75						
80						CUTTINGS ARE MEDIUM TO COARSE SAND SIZE, SUBANGULAR, 50% QUARTZ, 40% FELDSPAR, 10% DARK GRAINS
85						

BORING LOG

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL #: MW-1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
90						
95						SAME AS ABOVE 40% QUARTZ, 40% FELDSPAR, 20% DARK COLORED GRAINS
100						
105		5" DIAMETER SCHEDULE 80 PVC				
110						CUTTINGS ARE COARSE SAND SIZED 50% QUARTZ, 40% FELDSPAR, 10% DARK COLORED GRAINS
115						
120		CONCRETE - BENTONITE GROUT				45% QUARTZ, 40% FELDSPAR, 15% DARK COLORED GRAINS
125						
130						
135						
140						
145						50% QUARTZ, 35% FELDSPAR, 15% DARK COLORED GRAINS
150						

BORING LOG

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL #: MW-1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
155						
160						45% QUARTZ, 40% FELDSPAR, 15% DARK COLORED GRAINS
165						
170		5" DIAMETER SCHEDULE 80 PVC				
175						
180						
185						
190		CONCRETE - BENTONITE GROUT				190' - 245' SILT - CLAY, VERY LITTLE SAND IN CUTTINGS, SLOW DRILLING
195						
200						
205						
210						
215						

BORING LOG

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL # : MW-1

PAGE : 5 OF 7

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
220						
225						
230						
235		5" DIAMETER SCHEDULE 80 PVC				
240		CONCRETE - BENTONITE GROUT				
245						COARSE SAND SIZED GRAINS, SURROUNDED TO ANGULAR, 50% QUARTZ; 25% FELDSPAR, 25% EPIDOTE, IRON ORE, GRANITE FRAGMENTS
250						
255						
260						260' COBBLES - BOULDERS
265						264' COBBLES - BOULDERS
270		BENTONITE				
275						
280		#3 MONTEREY SAND				

BORING LOG

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL #: MW-1

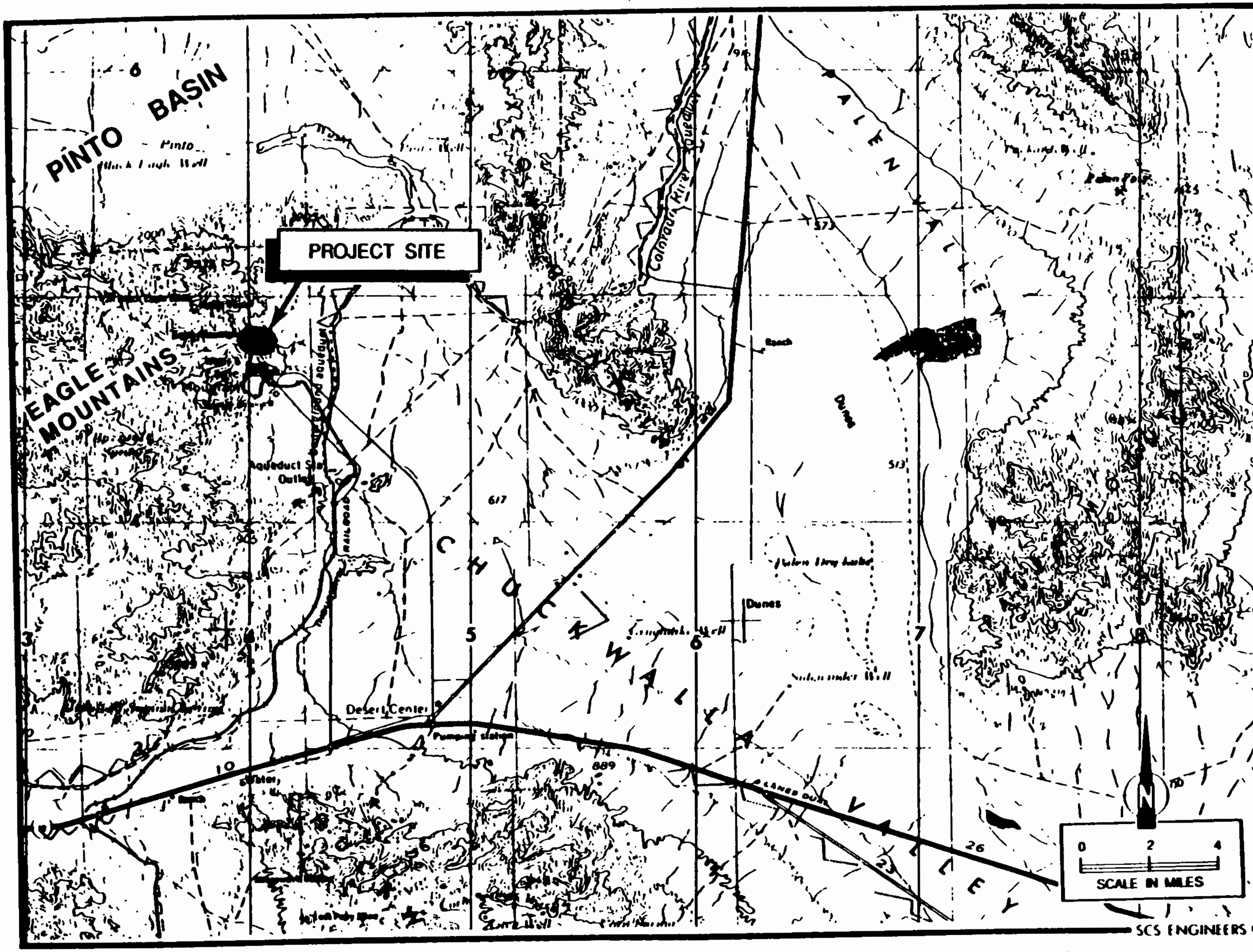
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
285		#3 MONTEREY SAND BRIDGES IN HOLE				284' - 290' COBBLES - BOULDERS
290						
295		5" DIAMETER SCHEDULE 80 PVC				
300		HOLE CAVES				COARSE SAND SIZED CUTTINGS, 30% MAFIC ROCK FRAGMENTS, 30% QUARTZ, 30% FELDSPAR, 10% EPIDOTE
305						
310						
315						318' COBBLES - BOULDERS
320		NATIVE SOIL				
325						328' - 330' COBBLES - BOULDERS
330						
335		60' .020" SLOT PVC				
340						
345						

BORING LOG

PROJECT: EAGLE MOUNTAIN | HOLE / WELL #: MW-1

JOB NUMBER: 0187073.03 | PAGE: 7 OF 7

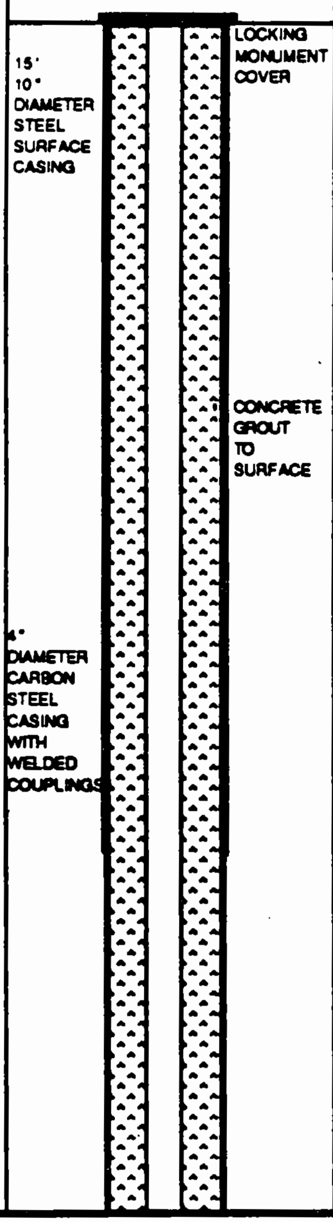
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
350						WATER AT 350' ? MUD THINS OUT
355		HOLE CAVES				
360		NATIVE SOIL				
365						
370		.020" SLOT PVC				
375						374' - 377' SILT - CLAY VERY LITTLE SAND IN CUTTINGS, SLOW DRILLING
380						380' COBBLES - BOULDERS
385		PVC END CAP				COARSE SAND SIZED CUTTINGS, 40% QUARTZ, 30% FELDSPAR, 30% IRON ORE, EPIDOTE, MAFIC ROCK FRAGMENTS
390		HOLE CAVES TO 398'				
395						
400						398' - 400' ANGULAR CHIPS OF IRON ORE TO 0.2"
						T D = 400'


PINTO BASIN
EAGLE MOUNTAINS
PROJECT SITE
Aqueduct Station Outlet
Desert Center
Pumping station
Dunes
CHUCKWALLA VALLEY
PALEN VALLEY
Colorado River Aqueduct
0 2 4
SCALE IN MILES
SCS ENGINEERS

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807 - 3315
(213) 426 - 9544
FAX (213) 427 - 0805

PROJECT: EAGLE MOUNTAIN
HOLE / WELL # : BH 4 / MW 2
LOCATION :
DIAMETER : 10 "
JOB NUMBER : 0187073.09
TOTAL DEPTH : 455 '
GEOLOGIST / ENGINEER : B. GARBACCIO
DATE STARTED : MARCH 26, 1990
DRILLER : BEYLIK
DATE COMPLETED : APRIL 4, 1990
DRILL RIG : PORTADRILL
SAMPLING DEVICE : CYCLONE
DRILLING METHOD : AIR ROTARY / MUD ROTARY
PAGE : 1 OF 9



DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
						START WITH AUGER TO SET SURFACE CASING
0						
1					SC - GC	0 - 15 ' - TAN - LIGHT BROWN CLAYEY SAND WITH GRAVEL, COBBLES AND BOULDERS (TO 6 " OBSERVED); SUBANGULAR TO SUBROUNDED; GRANITE, QUARTZITE, IRON ORE; DRY
2						
3						
4						
5						
6						
7						
8						
9						15 ' - 60 ' - DRILLED WITH 8 " DOWNHOLE HAMMER
10						
11						
12						CUTTINGS SEGREGATE IN CYCLONE
13						
14						
15					SP	SAND WITH GRAVEL TO 1 " OBSERVED, GRANITE WITH GREENSCHIST ALTERATION, CALC SILICATE ROCK, QUARTZITE, IRON ORE; NO CEMENT; SMALLER FRACTION IS MORE ANGULAR (FRAGMENTS OF LARGER ROCKS)
16						
17						
18						
19						
20						20 ' - SLIGHT CAVING

BORING

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL #: BH 4 / MW 2

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
30						
40					SP	40' - FINES ARE LOST FROM CYCLONE COARSE SAND AND GRAVEL TO 2" OBSERVED, ANGULAR TO SUBROUNDED, GRANITE, IRON ORE, QUARTZITE; NO CEMENT OR CLAY OBSERVED
						40' - 45' - BEGIN TO GET INTO CEMENTED ZONE, SEVERAL OF THE 0.1 - 0.2" GRAVEL GRAINS HAVE TAN CLAY COATINGS
50		4" DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE				
60					SP - GW	60' - SWITCH TO 5" TRICONE BIT
						SAND AND GRAVEL TO 1" OBSERVED, ANGULAR TO SUBROUNDED, WHOLE CLASTS AND PIECES OF LARGER ROCKS, NO CLAY OR CEMENT; GRANITE, QUARTZITE, IRON ORE, PALE GREEN MARBLE, EPIDOTE; DRY
70						
						75' - TRACE CEMENT ON 0.1 - 0.2" GRAVEL
80						80' - 85' - SMALL PIECES OF GRAVEL ARE PARTLY COATED WITH CLAY CEMENT, LARGE QUANTITY OF FINE BROWN CLAY IN DUST FROM CYCLONE, COHESIVE WHEN WET; DRY

BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL # : BH 4 / MW 2

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
90						
						95 ' - GRAVEL HAS CLAY COATINGS, VERY LITTLE CLAY IN FINES
100					SP	100 ' + - COARSE SAND WITH <10% GRAVEL; FINES ARE NOT COHESIVE WHEN WET; GRAVEL HAS SAND GRAINS CEMENTED TO IT; DRY
110		4 " DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE			SP	105 ' - 110 ' + - SAND WITH 10 - 20% GRAVEL TO 1 ", VERY LITTLE FINES; GRAVEL HAS CLAY - CEMENT COATINGS, MOSTLY SUBROUNDED; GRANITE, FINE GRAINED CALC SILICATE ROCK, EPIDOTE, WHITE QUARTZITE, RED BROWN VESICULAR VOLCANIC OR DIKE ROCK
120						
					SP	125 ' - SAME AS ABOVE
130						
					SP	135 ' - VERY LITTLE FINES; GRAVEL IS MOSTLY ANGULAR QUARTZITE FROM LARGER ROCKS; SUBROUNDED GRANITE AND FINE GRAINED CALC SILICATE ROCK HAS CLAY - CEMENT COATINGS
140						
					SC	145 ' - 150 ' + - CLAY RICH ZONE WITH COARSE SAND AND GRAVEL TO 0.5 "; CLAY IS LIGHT TAN (REDDISH BROWN WHEN WET), GRAVEL IS ANGULAR TO SUBROUNDED; GRANITE, QUARTZITE, BLACK FINE GRAINED MAFIC DIKE ROCK, IRON ORE; SOME PIECES HAVE CLAY COATINGS; DRY

BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL # : BH 4 / MW 2

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
150						
160					SC	165 ' + - CLAY RICH ZONE WITH SAND + 20% GRAVEL TO 0.5 " (MOSTLY < 0.3 ") OBSERVED, SUBANGULAR TO SUBROUNDED, CLAY COATINGS ON SOME PIECES; META- ARKOSE, GRANITE, QUARTZITE, IRON ORE; DRY
170		4 " DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE				
180					SC - GC	180 ' - 185 ' + - CLAY RICH ZONE WITH COARSE TO VERY COARSE SAND AND GRAVEL; GRAVEL IS ANGULAR TO SUBROUNDED, GRANITE, QUARTZITE, IRON ORE; DRY
190					CL	190 ' - CLAY RICH ZONE WITH < 20% SAND AND GRAVEL, CLAY IS LIGHT TAN (MEDIUM PINK - BROWN WHEN WET), GRAVEL INCLUDES GRANITE, IRON ORE (MAGNETITE), DIORITE, QUARTZ, EPIDOTE
					SP - GW	195 ' - COARSE SAND AND GRAVEL TO 0.5 ", MOSTLY ANGULAR CHIPS OF GRANITE AND IRON ORE (MAGNETITE)
200					SC	205 ' - CLAY WITH SAND AND GRAVEL TO 0.5 " OBSERVED, ANGULAR TO SUBROUNDED, GRANITE, IRON ORE, QUARTZITE, EPIDOTE; DRY

BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073 09

HOLE / WELL # : BH 4 / MW 2

PAGE : 5 OF 9

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
210						
220						
					SP	225 ' - COARSE TO VERY COARSE SAND WITH APPROXIMATELY 10% GRAVEL, ROUNDED GRAINS; DRY
230		4 " DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE			SC - GC	230 ' - CLAY WITH SAND AND GRAVEL, GRANITE, MAFIC DIKE ROCK, QUARTZITE
240						
					SC - GC	245 ' - 280 ' - CLAY WITH SAND AND GRAVEL TO 0.7 " OBSERVED, GRAVEL IS ANGULAR TO SUBROUNDED, GRANITE, EPIDOTE, QUARTZITE, IRON ORE, WITH CLAY - CEMENT COATINGS, DRY
250						
260						

BORING

PROJECT · EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL #: BH 4 / MW 2

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
270						
280					SP - GW	280 ' - 300 ' - CLAY WITH COARSE - VERY COARSE SAND AND GRAVEL TO 0.7 " OBSERVED, MOSTLY ANGULAR CHIPS OF QUARTZITE AND GRANITE; SUBROUNDED - ROUNDED IRON ORE, META-ARKOSE, GRANITE; DRY
290		4 DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE				
300						
310					SP	310 ' - CLAY WITH SAND AND <10% GRAVEL TO 0.5 " OBSERVED, SUBROUNDED, DIORITE, FINE GRAINED CALC SILICATE ROCK, QUARTZITE, MAFIC DIKE ROCK; AGGREGATES OF CEMENTED SAND; DRY
320						
					SP - GW	325 ' - CLAY WITH SAND AND 10 - 20% GRAVEL TO 0.5 " OBSERVED, MOSTLY ANGULAR TO SUBANGULAR, GRANITE, QUARTZITE, FINE GRAINED CALC SILICATE ROCK; SOME GRAINS HAVE CLAY COATINGS; DRY

BORING

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL #: BH 4 / MW 2

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
330					SC	330' - CLAY RICH ZONE SAND WITH GRAVEL TO 1" OBSERVED, SUBANGULAR, GRANITE, DRY
340					CL	340' - 345' - CLAY WITH APPROXIMATELY 10% SAND, CLAY HAS A TRACE OF MOISTURE
						346' - 347' - TRACE MOISTURE IN CLAY, GRAVEL HAS MOIST COATINGS
						348' - RED IRON ORE IN CUTTINGS
350		4" DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS; CONCRETE GROUT TO SURFACE				
360						
					SC	365' - CLAY WITH SAND
370		TOP OF SAND 374'				370' - DRY
		4" BENTONITE SEAL				
		CARBON STEEL TO STAINLESS STEEL DIELECTRIC CONNECTOR				375' - DRY
380		20' STAINLESS STEEL BLANK CASING			GC	380' - CLAY WITH GRAVEL TO 0.5" OBSERVED, MOSTLY FINE GRAINED CAL SILICATE ROCK, CLAY IS VERY SLIGHTLY MOIST

BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL # : BH 4 / MW 2

PAGE : 8 OF 9

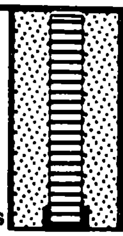
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
390			4-13-90 WATER LEVEL AFTER DEVELOP-MENT = 390'		SP	390' - 395' - COARSE SAND AND GRAVEL WITH AGGREGATES OF SAND CEMENTED TOGETHER
400			3-29-90 WATER LEVEL RISES TO 400' OVERNIGHT			400' - LET HOLE STAND OPEN FOR 15 MINUTES - NO WATER
					SP	405' - COARSE SAND WITH MINOR GRAVEL, GRANITE AND IRON ORE (MAGNETITE)
410		61' 0.20" SLOT STAINLESS STEEL SCREEN 394' - 456'; #3 MONTERY SAND				
420						INJECT WATER
					SW	425' - 430' - FINE TO COARSE SAND (NOT TYPICAL) WITH <10% GRAVEL TO 0.3" OBSERVED, ANGULAR, CLEAN - NO CEMENT, MOSTLY GRANITE WITH TRACE MANGNETIC IRON ORE
430		FLUSH THREADED COUPLINGS				
						435' - 440' - DRILL THROUGH BOULDERS OF IRON ORE, CUTTINGS TURN RED
440					SP	440' - COARSE SAND GRANITE, GLASSY QUARTZ, MAGNETITE - HEMATITE IRON ORE
						TD = 440' WITH AIR ROTARY

BORING

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL #: BH 4 / MW 2

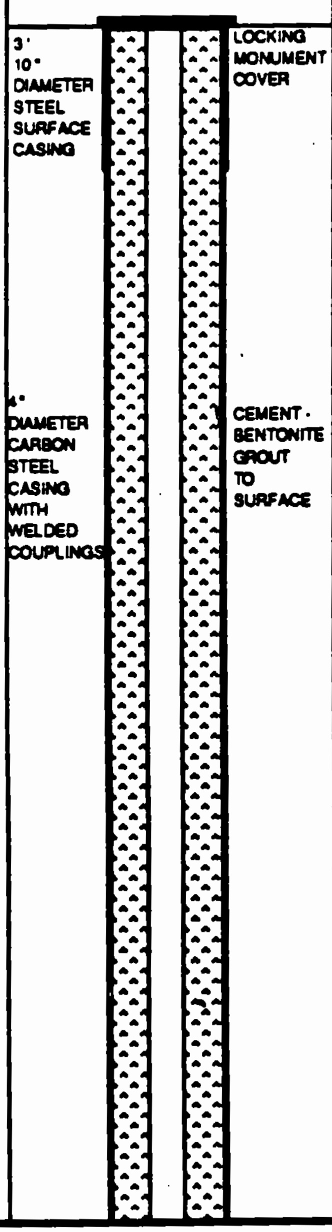
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
450		 #3 MONTERY SAND			SP	450' - SAND AND GRAVEL TO 0.5" OBSERVED, SUBROUNDED, MOSTLY RED BROWN META-ARKOSE
		WELDED STAINLESS STEEL END CAP TD = 455 FEET			SP	455' - MOSTLY SAND WITH CHIPS OF GRANITE, GLASSY WHITE QUARTZ, HEMATITE - MAGNETITE IRON ORE
460						HOLE IS ENLARGED WITH A 10" TRICONE BIT AND MUD ROTARY DRILLING
						TD WITH 10" = 455 FEET

BORING LOG

SCS ENGINEERS
Environmental Consultants
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807 - 3315
(213) 426 - 9544
FAX (213) 427 - 0805

PROJECT: EAGLE MOUNTAIN | HOLE / WELL #: BH 5 / MW 3
LOCATION: | DIAMETER: 8"
JOB NUMBER: 0187073.09 | TOTAL DEPTH: 380'
GEOLOGIST / ENGINEER: B GARBACCIO | DATE STARTED: APRIL 4, 1990
DRILLER: BEYLIK | DATE COMPLETED: APRIL 10, 1990
DRILL RIG: PORTADRILL | SAMPLING DEVICE: CYCLONE
DRILLING METHOD: REVERSE CIRCULATION AIR ROTARY WITH DOWNHOLE HAMMER | PAGE: 1 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
0						0 - 1' - CLAY AND GRAVEL, MINE DEBRIS
1						
2						
3						
4						
5						TOP 5' - DRILLED WITH TRICONE TO SET SURFACE CASING
6						
7						
8						
9						
10						1 - 28' - MEDIUM GRAY GREEN FINE GRAINED CALC SILICATE ROCK
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						



BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL #: BH 5 / MW 3

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
30						28' - MEDIUM - DARK GREEN FINE GRAINED CALC SILICATE ROCK WITH APPROXIMATELY 50 % DARK GRAY - BLACK FINE GRAINED MAFIC DIKE ROCK, TRACE MAGNETIC ROCK
40		CEMENT - BENTONITE GROUT TO SURFACE				32' - 65' - LIGHT GREEN FINE GRAINED CALC SILICATE ROCK WITH 5 - 10 % DARK GRAY - BLACK MAFIC DIKE ROCK
50						
60		4" DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS				65' - 80' - LIGHT - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK WITH APPROXIMATELY 25 % DARK GRAY - BLACK FINE GRAINED MAFIC DIKE ROCK
70						
80						80' - 87' - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK WITH MEDIUM BROWN COARSE GRAINED FELDSPAR
90						87' - 100' + - MEDIUM REDDISH BROWN HEMATITE IRON ORE (MAGNETIC)
100						100' - CUTTINGS CONTAIN APPROXIMATELY 10 % TREMOLITE
110						
120						
130						130' - SAME AS ABOVE, WITH TRACES OF WHITE - CREAM COLORED MARBLE 135' - SAME AS ABOVE, TRACES OF PYRITE
140						

BORING

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.09

HOLE / WELL # : BH 5 / MW 3

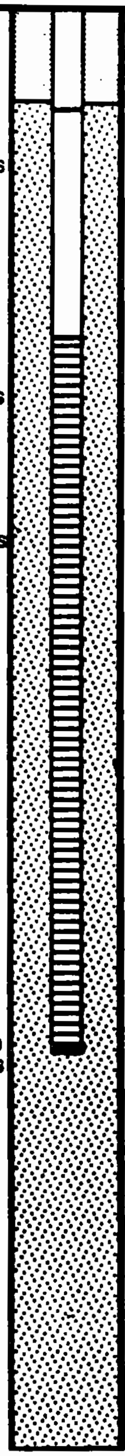
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
						148 ' - MEDIUM BROWN HEMATITE IRON ORE WITH TRACES OF PYRITE AND APPROXIMATELY 50 % MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK
150						
160		CEMENT - BENTONITE GROUT TO SURFACE				160 ' - MEDIUM - DARK GREEN FINE GRAINED CALC SILICATE ROCK WITH TRACES OF WHITE FIBROUS TREMOLITE
170						165' - 185 ' - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK
180		DIAMETER CARBON STEEL CASING WITH WELDED COUPLINGS				185 ' - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK WITH 10 - 20 % RED BROWN HEMATITE IRON ORE (MAGNETIC) AND TRACES OF EPIDOTE
190						
200						200 ' - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK WITH APPROXIMATELY 5 % LIGHT OLIVE GREEN QUARTZITE
210						
220						210 ' - 250 ' - MEDIUM - DARK GRAY GREEN QUARTZITE
230						
240						
250						250 ' - 260 ' + - MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK WITH APPROXIMATELY 10% QUARTZ VEIN OR GRANITE PEGMATITE MATERIAL AND TRACE HEMATITE IRON ORE
260		5' BENTONITE SEAL				

BORING

PROJECT : EAGLE MOUNTAIN | HOLE / WELL # : BH 5 / MW 3

JOB NUMBER: 0187073.09 | PAGE : 4 OF 4

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
270		20' STAINLESS STEEL BLANK CASING; CARBON STEEL TO STAINLESS STEEL DI ELECTRIC CONNECTOR				270' - MIXED DARK GREEN FINE GRAINED CALC SILICATE ROCK AND MEDIUM BROWN QUARTZITE
280		#3 MONTEREY SAND TOP OF SAND 287'				280' - DARK GREEN FINE GRAINED CALC SILICATE ROCK WITH IRON STAINED SURFACES AND APPROXIMATELY 20 % GRANITE
290		61' .020" SLOT STAINLESS STEEL SCREEN 289' - 350'	WATER LEVEL AFTER DEVELOP-MENT 292'			290' - MEDIUM RED BROWN AND GRAY META - ARKOSE WITH 5 - 10 % GRANITE AND TRACE IRON ORE
300		FLUSH THREADED COUPLINGS				322 - 325' WET CUTTINGS FIRST OBSERVED
310						295' - 370' - MEDIUM RED BROWN AND GRAY META - ARKOSE WITH 20 % MEDIUM GREEN FINE GRAINED CALC SILICATE ROCK AND TRACE QUARTZ. CALC SILICATE ROCK IS IRON STAINED
320						
330						
340						345' - 350' - TRACES OF GRANITE AND QUARTZITE
350		THREADED STAINLESS STEEL END CAP; OPEN HOLE FILLED WITH #3 MONTEREY SAND 350' - 380'				
360						
370						
380		TD = 380 FEET				380' - MEDIUM - DARK GREEN FINE GRAINED CALC SILICATE ROCK



TD = 380 FEET

BORING LOG

SCS ENGINEERS
Environmental Engineers
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807-3315
(213) 426-9544
FAX (213) 427-0805

PROJECT: EAGLE MOUNTAIN

HOLE / WELL #: B H - 1

LOCATION:

DIAMETER: 10"

JOB NUMBER: 0187073.03

TOTAL DEPTH: 230'

GEOLOGIST / ENGINEER: B. GARBACCIO / K. LISTER

DATE STARTED: APRIL 4, 1989

DRILLER: PIONEER

DATE COMPLETED: APRIL 25, 1989

DRILL RIG: FAILING F 8

SAMPLING DEVICE: ———

DRILLING METHOD: AIR ROTARY

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
0						HOLE STARTED IN ALLUVIUM
1						LIGHT TAN SILTY SAND WITH POORLY SORTED GRAVEL TO BOULDER SIZED ROCKS
2						
3						
4						
5						
6						
7						
8						8' BEDROCK CONTACT DARK BLUE GREEN GRANITE WITH GREENSCHIST GRADE ALTERATION (CHLORITE + EPIDOTE)
9						
10						
11						
12						
13						
14						
15						DARK BLUE GREEN GRANITE - SAME AS ABOVE
16						
17						
18						
19						
20						

BORING LOG

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL #: B H - 1

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
25						
30						
35						
40						
45						DARK GREEN PORPHYRITIC GRANITE WITH EPIDOTE VEINS
50						
55						
60						
65						
70						
						GRANITE SAME AS ABOVE
75						
80						
85						

BORING LOG

PROJECT: EAGLE MOUNTAIN
JOB NUMBER: 0187073.03

HOLE / WELL #: B H - 1
PAGE: 3 OF 5

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
90						
95						DARK GREEN GRANITE WITH GREENSCHIST GRADE ALTERATION; FINE GRAINED MAFIC ROCK
100						
105						
110						
115						
120						
125						
130						
135						
140						
145						DARK GREEN GRANITE WITH GREENSCHIST GRADE ALTERATION AND SOME PALE PINK POTASSIUM FELDSPAR CRYSTALS TO 0.5", EPIDOTE VEINS
150						

BORING LOG

PROJECT : EAGLE MOUNTAIN

HOLE / WELL # : B H - 1

JOB NUMBER: 0187073.03

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
155						
160						
165						
170						
175						
180						180' SWITCH TO 6" PERCUSSION HAMMER
185						
190						
195						195 - 200' VERY EASY DRILLING, MAY BE A HIGHLY FRACTURED ZONE
200						
205						GRANITE WITH GREENSCHIST GRADE ALTERATION AND EPIDOTE VEINS
210						CUTTINGS ARE COARSE SAND SIZE; QUARTZ, FELDSPAR, EPIDOTE, CHLORITE
215						

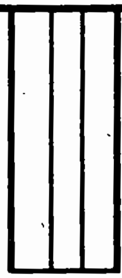
BORING LOG

PROJECT: EAGLE MOUNTAIN

HOLE / WELL #: B H - 1

JOB NUMBER: 0187073.03

PAGE: 5 OF 5

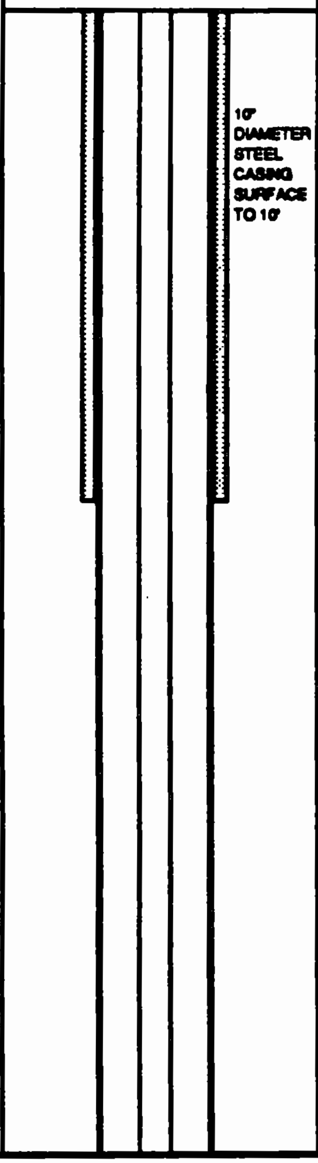
DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
220						
225						
230						TD = 230 ' NO WATER
235						
240						
245						
250						
255						
260						
265						
270						
275						
280						

BORING LOG

SCS
ENGINEERS
Environmental Engineers
3711 Long Beach Blvd.
Ninth Floor
Long Beach, CA
90807 - 3315
(213) 426 - 9544
FAX (213) 427 - 0805

PROJECT: EAGLE MOUNTAIN
HOLE / WELL #: BH-3
LOCATION:
DIAMETER: 6"
JOB NUMBER: 0187073.03
TOTAL DEPTH: 400'
GEOLOGIST / ENGINEER: B. GARBACCIO / K. LISTER
DATE STARTED: MAY 31, 1989
DRILLER: LAYNE ENVIRONMENTAL
DATE COMPLETED: JUNE 3, 1989
DRILL RIG: INGERSOLL - RAND
SAMPLING DEVICE: ———
DRILLING METHOD: REVERSE CIRCULATION AIR ROTARY

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
0						
1						
2						ALLUVIUM
3						LIGHT TAN SILTY SAND WITH POORLY SORTED GRAVEL TO LARGE BOULDERS, MOSTLY GRANITE
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						



BORING LOG

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL # : B H - 1

PAGE : 2 OF 5

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
25						26' CONTACT OF ALLUVIUM AND GRANITE BEDROCK
30						
35						DARK GREEN AND WHITE GRANITE WITH GREENSCHIST GRADE ALTERATION (CHLORITE + EPIDOTE)
40						CUTTINGS TO 2" ANGULAR
45						
50						
55						
60						SAME AS ABOVE
65						
70						
75						
80						
85						

BORING LOG

PROJECT : EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL # : B H - 3

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
90						
95						
100						DARK GREEN AND WHITE GRANITE WITH GREENSCHIST GRADE ALTERATION AND SOME PINK - GRAY POTASSIUM FELDSPAR CRYSTALS TO 0.5"
105						
110						
115						
120						SAME AS ABOVE
125						
130						
135						
140						
145						
150						SAME AS ABOVE

BORING LOG

PROJECT : EAGLE MOUNTAIN
HOLE / WELL # : B H - 3

JOB NUMBER: 0187073.03
PAGE : 4 OF 7

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
155						
160						
165						
170						
175						
180						
185						
190						
195						
200						
205						
210						
215						SAME AS ABOVE

BORING LOG

PROJECT: EAGLE MOUNTAIN

JOB NUMBER: 0187073.03

HOLE / WELL #: B H - 3

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
220						
225						
230						
235						
240						240' - 248' LIGHT TAN - PINK FINE GRAINED MARBLE
245						
						248' - 250' LIGHT TO MEDIUM GREEN SERPENTINE WITH APPROXIMATELY 50% FIBROUS MATERIAL (ASBESTOS)
250						
						250' - 254' LIGHT TO MEDIUM YELLOW GREEN SERPENTINE; MASSIVE, NOT FIBROUS
255						
260						
265						
						MEDIUM GREEN AND PINK GRANITE WITH GREENSCHIST GRADE ALTERATION
270						273' - 276' OPEN SPACE ? LOSE AIR PRESSURE
275						
280						

BORING LOG

PROJECT : EAGLE MOUNTAIN
JOB NUMBER: 0187073.03

HOLE / WELL # : B H - 3

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
285						DARK GREEN AND WHITE GRANITE WITH GREENSCHIST GRADE ALTERATION (CHLORITE)
290						
295						DARK BLACK AND WHITE FINE GRAINED HORNBLENDE DIORITE (DIKE) AND LIGHT PINK - GRAY MAFIC POOR GRANITE
300						
305						
310						
315						DARK BLACK AND WHITE HORNBLENDE - DIORITE
320						DARK BLACK FINE GRAINED FOLIATED MAFIC ROCK
325						
330						DARK GREEN AND WHITE GRANITE AND DIORITE WITH GREENSCHIST GRADE ALTERATION , AND CHLORITE ON SHEAR SURFACES
335						335' - 340' DARK BLACK AND WHITE HORNBLENDE DIORITE WITH LIGHT YELLOWISH QUARTZITE
340						
345						

BORING LOG

PROJECT EAGLE MOUNTAIN
JOB NUMBER: 0187073.03

HOLE / WELL #: B H - 3

DEPTH (FEET)	SAMPLE	COMPLETION DETAIL	SAMPLE #	BLOW COUNTS / FOOT	USCS SYMBOL	DESCRIPTION
350						LIGHT GRAY AND PINK GRANITE WITH MINOR GREENSCHIST GRADE ALTERATION
355						350' - 356' LIGHT TAN - GRAY FELDSPATHIC QUARTZITE
						356' DARK BLACK FINE GRAINED MAFIC ROCK
360						
365						
370						370' DARK GRAY TO BLACK FINE GRAINED, FOLIATED MAFIC ROCK
375						
380						380' DARK GREEN AND PINK GRANITE WITH GREENSCHIST GRADE ALTERATION (CHLORITE)
385						
390						
395						DARK GREEN - BLACK HORNBLENDE - DIORITE
400						T D = 400'

APPENDIX D

TRANSPORTATION IMPACT ANALYSIS
for the
PROPOSED EAGLE MOUNTAIN LANDFILL

submitted to

Recon
1276 Morena Boulevard
San Diego, CA 92110

submitted by

DKS Associates
2700 North Main Street, Suite 900
Santa Ana, CA 92701

July 1990
P89246x2

DKS *Associates*

Table of Contents

Tables

Figures

1. Executive Summary

1. Executive Summary

This report describes the results of a study of the transportation related impacts of the proposed landfill at Eagle Mountain. Potential impacts would affect two major modes of transportation, rail transport and highway transport.

Unit trains carrying nothing but refuse would deliver 16,000 tons of refuse to the site daily, while an additional 4,000 tons would be delivered to the site each day by trucks. The highway system would also be affected by the additional traffic related directly to on-site operations, such as employees traveling to and from the site, service vehicles, deliveries, and other traffic.

The overall report describes existing conditions related to both types of transportation, details the projected future conditions in the year 1995 without the project, and describes the characteristics of the project related to transportation and the impacts of these characteristics on the surrounding transportation infrastructure in the study area.

EXISTING CONDITIONS

Existing conditions along both the proposed rail routes to the site and on roadways in the vicinity of the project are assessed in detail. The study area for the rail mode of transport includes all rail lines that may carry refuse from transfer stations to the site. A total of six representative transfer station locations are identified, in San Bernardino, Los Angeles, and Orange counties. The primary rail study area includes the rail lines that are traversed by all refuse trains destined for the landfill. All rail lines carrying only a portion of the train traffic are referred to as the secondary rail lines.

The rail route existing conditions analysis includes 268 miles of rail line, with more than 230 at-grade crossings identified along these lines. Data pertaining to usage of these crossings by both trains and highway vehicles were obtained at over 97% of these locations. The rail study area conditions were analyzed in detail at all at-grade crossings on the rail routes within 146 miles of the site (the primary segment), and at all at-grade crossings on secondary rail segments that would experience more than one-half hour of total vehicle delay (i.e., sum of delay of all vehicles waiting at the crossing while the train passes) when a train with the characteristics of the proposed refuse unit trains passed during the expected hours of unit train operation. A total of 95 at-grade crossings were targeted for detailed analysis, based on these criteria.

Existing train traffic volumes in the study area range from less than ten trains daily, at some crossings, to 50 trains per day in the vicinity of Colton. Train traffic along the primary segment ranges from 28 to 50 trains per day, with a median average of 35 trains per day along this segment. Train traffic along the secondary segments tended to be significantly lower, ranging from 2 to 35 trains per day.

The average daily volume of highway traffic using the at-grade crossings ranges from an average of 2,200 vehicles per day along the primary analysis segment to the highest average of 14,100 vehicles per day along one of the secondary analysis segments. The highest highway traffic volumes along the rail routes occur in Los Angeles and Orange counties.

Estimated at-grade crossing delays to highway vehicles resulting from the passage of a single refuse unit train were calculated for comparison to delays in later years, even though no unit trains of this type are currently operating. These delays ranged from very low (less than 0.01 total vehicle-hours of delay) at some primary rail segment locations to a high of 3.5 vehicle-hours of delay at Slauson Avenue in Huntington Park. Discussions with the California Public Utilities Commission suggest that delays at crossings on the Alameda Line serving the Port of Los Angeles are considered problematic. Delays at crossings in this part of the region typically ranged from one to three or more hours of cumulative delay per train.

Total delay to highway vehicles, using all of the at-grade crossings along the primary segment that would result from the passage of a single unit train under existing conditions, would be an estimated 0.94 vehicle-hour. The maximum average delay for an individual vehicle at any crossing would be approximately one to two minutes, while the cumulative delay at each individual crossing ranged between 0.01 and 0.17 hour.

A measure of the relative hazard at each at-grade crossing was also calculated for existing conditions. This hazard index was used to rank the various at-grade crossings studied in detail, and ranged from a low of 200 to a high of 222,900. The index is intended to indicate the relative rank of each crossing, or how hazardous each crossing is relative to the others assessed, rather than establishing an absolute measure of hazard or risk.

Crossings along the primary segment tended to be ranked lower than crossings along the secondary analysis segments, with the highest ranked crossing along the primary segment in Riverside County being Monroe Street in Indio, which was ranked 27th overall. The California Public Utilities Commission performs a similar calculation for informational purposes only. They are responsible for administering the federal Grade Crossing Improvement Program, and locations identified for improvements are determined based on discussion with local jurisdictions.

The assessment of existing conditions on roadways in the vicinity of the project focused on the interchanges of I-10 with Eagle Mountain Road and Desert Center Rice Road, and roadways leading to the site of the proposed landfill. This analysis included examination of roadway geometrics, particularly characteristics critical to the usage of the proposed truck route by large vehicles, and system operations, as determined by the analysis of roadway segment and intersection operations during the peak hour of traffic in the study area.

The existing geometrics of the proposed truck route, Eagle Mountain Road and the proposed Eagle Mountain Road Extension, are well-suited to use by the trucks that will be carrying refuse to the site. No evidence of deficient turning radii, horizontal and vertical alignment, or roadway widths was found along the existing portions of the proposed truck route.

Analysis of existing roadway segment and intersection operations indicates that current operations are excellent, with Level of Service "A" (LOS A) conditions for all traffic movements analyzed.

FUTURE CONDITIONS WITHOUT THE PROJECT

The proposed landfill will not be fully operational until 1995. Conditions within the transportation study areas will have changed, and it is necessary to project and analyze these changes to provide a valid baseline condition for estimation of project impacts.

The physical characteristics of the rail and highway system are not expected to undergo significant change between 1989 and 1995. The volume of rail traffic on the rail lines studied is also expected to remain fairly static during this period. Highway traffic volumes, however, are sensitive to the increasing urbanization of the region, and these increases will affect both the rail and highway analyses.

The annual growth rates for highway traffic using at-grade crossings and on roadways included in the highway impacts study area were projected based on regional data pertaining to projected trip-making characteristics in the vicinity of the at-grade crossing/roadway. Projected average annual growth in highway traffic ranged from a low of 0.7% per year in the East San Gabriel Valley to a high of 3.6% per year in the Chino Basin region of San Bernardino County. Growth in the Desert Center area is projected to be at a rate of 3.5% per year, or 23% growth between 1989 and 1995.

The overall at-grade crossing delays that would be caused by the passage of a single unit train of refuse would increase because of the increased number of vehicles impacted, although the average per vehicle delay would not change significantly. The total delay caused by such a train traversing the primary segment (Colton to Eagle Mountain) during the nighttime hours of operation anticipated would increase by 25%, from 0.94 vehicle-hours of delay to 1.16 vehicle-hours of delay.

Recalculation of the hazard indices for each of the at-grade crossings assessed under existing conditions indicates that the faster growth in the outlying areas of the region would result in somewhat higher positions in the overall ranking of at-grade crossings by hazard level. However, the highest ranked location in Riverside County, Monroe Street in Indio, would continue to be ranked 27th. The highest ranking locations, based on hazard index, would still be found in the more urbanized parts of the study area, Los Angeles and Orange counties.

The increased traffic volumes were also used to reassess roadway segment and intersection operating conditions. The results of this analysis indicate that LOS A conditions are projected for all traffic movements analyzed. This represents the best possible traffic conditions on the traffic engineer's scale.

FUTURE CONDITIONS WITH THE PROJECT

The project is expected to be capable of accepting up to six unit trains per day at the marshalling yard. An average of 4.7 shipments per day will be required when the project is operating at capacity (16,000 tons of waste by rail per day). These shipments will require twice as many trains per day, one to deliver the waste, and a second outgoing train returning empty containers to the transfer station.

Based on this description, an average of 9.4 trains per day will utilize the primary rail segment, with fewer trains on each of the secondary segments. The maximum number of vehicles delayed at any one crossing on the primary rail line segment would be 15 vehicles at Monroe Street. The average delay experienced by each of these vehicles is 0.8 minute (about 45 seconds). A total of 2.5 minutes would pass from the moment the gate started down until the moment the last car at the rear of the vehicle queue crossed the railroad tracks. The total delay at each individual crossing is projected to range from 0.01 to 0.21 hour per train, significantly less than the one to three hours of cumulative delay encountered at crossings identified by the California Public Utilities Commission as experiencing delay problems. Based on this fact, there is no significant impact on delays along the primary segment.

The total daily delay caused by the passage of these trains on the primary segment will be slightly less than 11 vehicle-hours. When the delay incurred by vehicles using the at-grade crossings analyzed on the secondary segments are included, the total delay increases to nearly 80 vehicle-hours daily. Most of the delays (46 vehicle-hours) occur along the line servicing Orange County.

Overall, these delays compare favorably with other rail facilities. The delay at a single at-grade crossing located in the southern California region can be 100 to 300 vehicle-hours daily. Similarly, the delay caused by the traffic light at a single intersection of two arterials carrying 20,000 vehicles daily is on the order of 300 vehicle-hours per day.

The impact of the project on the level of hazard for the various at-grade crossings studied was also analyzed. Although certain at-grade crossings in Riverside County moved up in the overall rankings, the highest ranked crossing in Riverside County is 22nd, at Monroe Street in Indio. Overall, the number of Riverside County at-grade crossings in the top half of the rankings did not change and no crossing is in the highest seven percent of the rankings, the benchmark established to identify a deficiency.

In addition to the empirical analysis and comparison conducted, the effect of the project on rail operations and safety was discussed with Southern Pacific Transportation Company and the California Public Utilities Commission. Their response to the proposed schedule and operations of the project is that the proposed train schedule is feasible and the project will not create any significant new safety hazards.

The project is also expected to affect the highway network. A total of 200 two-way truck trips will be required each day to deliver 4,000 tons of refuse by this mode of transport. The expected on-site activities are projected to generate an additional 500 trip ends (or 250 two-way trips) because of employee and other on-site activity related trips.

Almost all of the truck trips and 85% of the other trips are expected to be to and from the west of Eagle Mountain. The other trips to and from the site are expected to be divided between the east (10%) and the north (5%).

Analysis of the operating conditions on roadway segments and at the intersections included in the study indicates that all traffic movements will continue to experience LOS A operations.

The impacts related to realignment of the Eagle Mountain Railroad and the extension of Eagle Mountain Road were also examined. The realignment of the Eagle Mountain Railroad will create a new crossing with Kaiser Road. The hazard level at this location was analyzed assuming an at-grade crossing with various types of protection, such as signing or automatic gates. It is recommended that an automatic gate be constructed at this location, because of the nearby high school. This at-grade crossing would be ranked 95th out of 96 crossings under these conditions (e.g., there was only one less hazardous crossing location studied).

Similarly, the extension of Eagle Mountain Road will also create an intersection with Kaiser Road. It is recommended that this location be controlled by a two-way stop sign configuration, with the stop signs located on the lower volume roadway, Kaiser Road.

PROJECT ALTERNATIVES

Two alternatives to the project have been identified and analyzed in this study. The first alternative eliminates all deliveries of refuse to the site by truck, without affecting shipments via rail at all. The second alternative would reduce the quantity of material received daily by reducing shipments by both rail and truck.

The first alternative to the proposed project is the removal of all truck deliveries of refuse to the site. In this case, only trains would bring refuse to the site. This alternative would have no significant effect on the projected impacts along the rail routes studied. The projected delays or hazard levels along the rail lines would remain unchanged.

The proposed alternative would significantly reduce traffic to the site. Removal of refuse deliveries by truck would reduce the average daily traffic generated by the project from 1,300 trip ends per day to 500 trip ends per day. All of the reduction would occur along I-10, Eagle Mountain Road, and the Eagle Mountain Road Extension. Traffic on Kaiser Road and Desert Center Rice Road would experience the same increase in traffic as previously projected.

Operating conditions at study area intersections would continue to be excellent under this alternative, with all traffic movements operating at LOS A.

The second alternative to the proposed project will reduce the quantity of material shipped by rail from 16 tons daily to 14 tons daily, and will also reduce the quantity of material shipped by truck from four tons daily to two tons daily.

The reduction in the quantity of material shipped by rail would result in an average of 4.1 trains per day delivering refuse to the site. The amount of daily delay would be reduced proportionately, while the per train delays would remain unchanged. Similarly, the calculated values of the indices would be reduced by 13% along the primary segment, as the hazard index is directly proportional to the daily train volume. Similar but smaller effects of this alternative would occur along the secondary rail segments. Therefore, the finding of no significant impact made for the primary project would still apply.

The reduction in truck traffic would again affect only I-10, Eagle Mountain Road, and the Eagle Mountain Road extension. Two hundred one-way truck trips would be eliminated, and the overall number of trip ends generated by the project would drop from 900 to 700 trip ends per day. Level of service A conditions would still prevail for all traffic movements analyzed in the study area, and a finding of no impact is again applicable.

2. Introduction

2. Introduction

The proposed Eagle Mountain landfill will provide a much needed increase in the southern California region's waste disposal capacity. The effects of the landfill on the transportation infrastructure have been studied, and the results of the transportation study are discussed in this report. The proposed project is expected to utilize two modes of transportation, rail and highway. Figure 1 presents the location of the project with respect to the region.

The majority of the trash transported to the site would arrive via rail, as the Eagle Mountain site is served by a privately owned rail spur constructed by Kaiser Corporation to haul iron ore from the Eagle Mountain Mine to its steel plants located elsewhere in the region. An estimated 16,000 tons of trash per day would arrive via rail. The 4,000 foot long unit trains used to transport trash to the site would be considerably shorter and lighter than the ore trains previously leaving the site.

The trash would be collected at approximately six transfer stations located near the areas generating trash throughout the greater Los Angeles region. The San Gabriel Valley is one area where large quantities of trash are generated while remaining landfill capacity is dwindling rapidly. The City of Los Angeles is another area that has been identified as a possible client for the landfill.

The northern Orange and western San Bernardino county areas are also considered as potential clients for the Eagle Mountain landfill. The analysis of rail impacts was conducted assuming transfer station locations near the geographic centers of these wastesheds and along rail lines of the Southern Pacific Railroad. The northern Orange County area is served by a Southern Pacific line originating at Southern Pacific's Los Angeles Transportation Center.

The analysis conducted during the course of this study assumes that the transfer station would be located along this line, near the boundaries of Anaheim, Buena Park, and Fullerton. Similarly, the analysis of the San Bernardino wasteshed assumes that the transfer station would be located along the Southern Pacific's Alhambra/Yuma line in the Colton/Rialto/Fontana area. The use of these geographically centered locations for analysis reduces the possibility of a significant over or underestimation of project related impacts.

The rail lines have been divided into two basic categories, the primary rail line segment and secondary rail line segments. The primary rail segment includes the entire length of rail line that must be used by all shipments. The primary rail segment is 146 miles long, and includes the Eagle Mountain Railroad and the section of Southern Pacific Transportation Company's Yuma/Alhambra line between Ferrum Junction and Colton. The assumed transfer station locations and rail lines potentially serving the project are shown in Figure 2.

DKS Associates

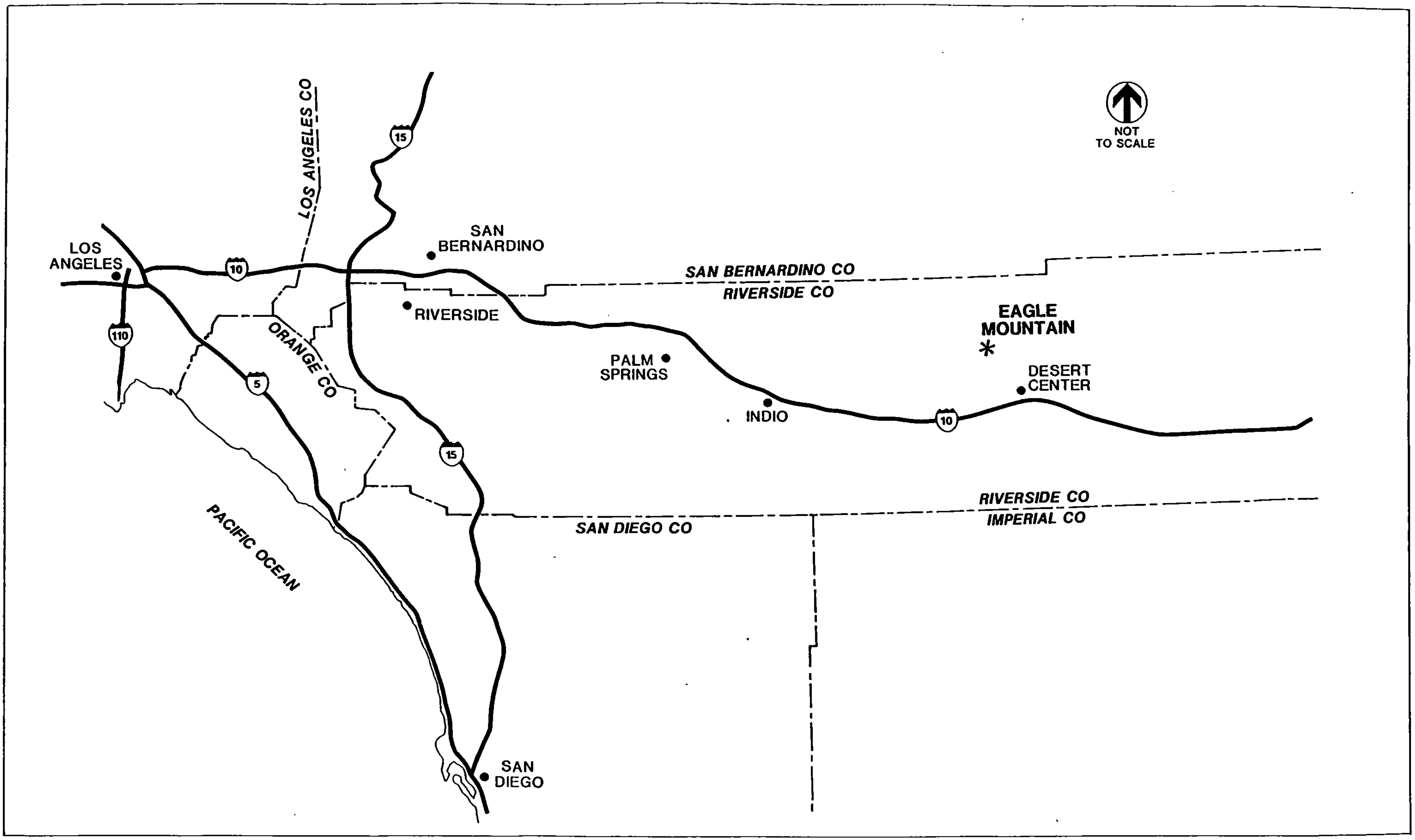


Figure 1
PROJECT LOCATION

DKS Associates

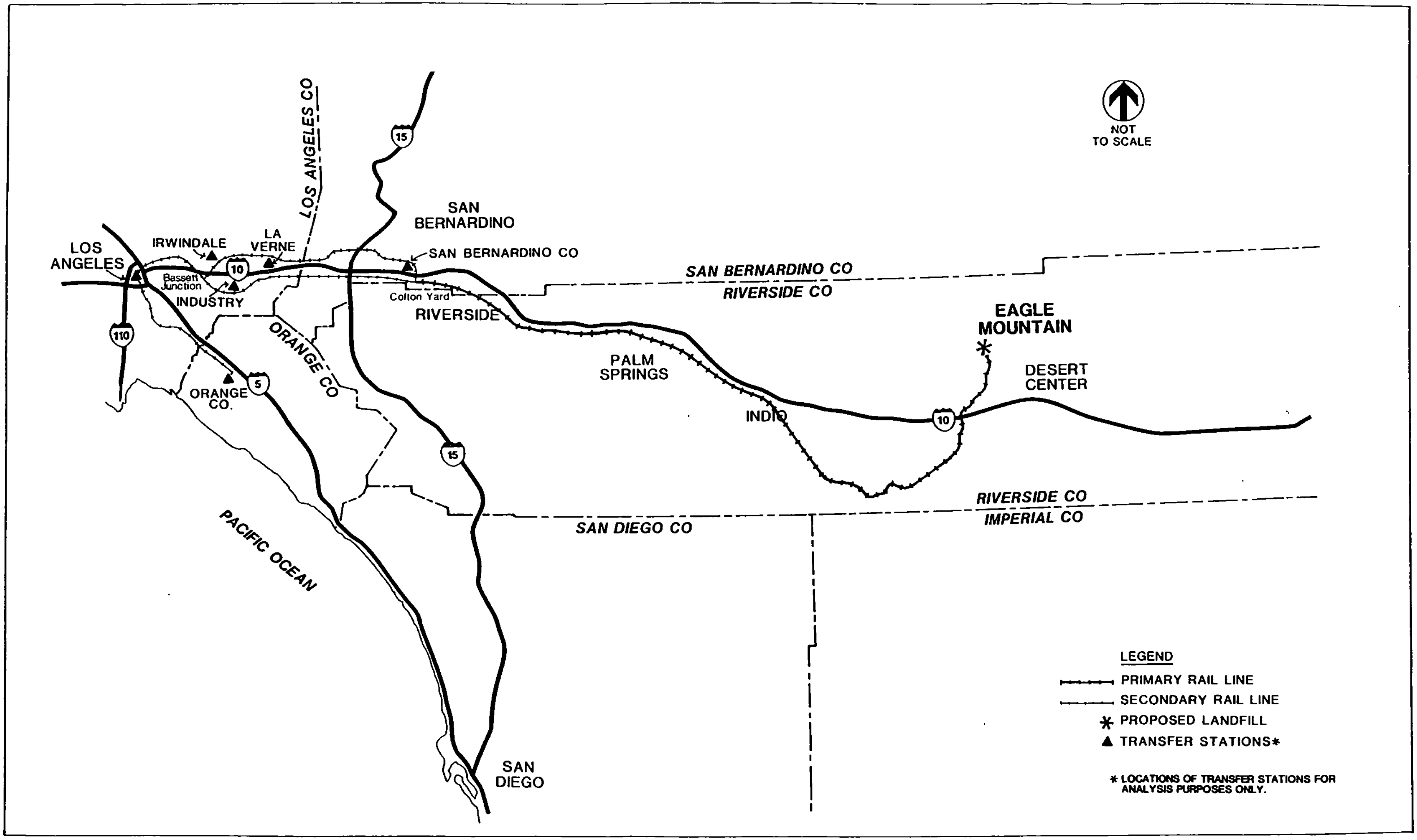


Figure 2
RAIL LINES AND TRANSFER STATIONS

A portion of the overall trash delivered to the Eagle Mountain landfill would arrive via truck. A maximum of approximately 4,000 tons of refuse per day is projected to arrive at the site using the surface highway network. Truck shipments in intermodal shipping containers and conventional transfer trailers would be accepted at the site. This truck traffic would use Interstate Highway 10 (I-10) and Eagle Mountain Road to access the site. The Kaiser truck road would be realigned to avoid the populated areas near the former mine, and provide access directly to the proposed marshalling yard where deliveries of trash would be accepted and processed.

The analysis of rail impacts related to the project assesses both the increase in overall rail traffic on rail lines likely to serve the Eagle Mountain landfill, as well as the increase in at-grade crossing delays at the most heavily traveled roadway crossings along the rail routes. The effect of increased rail traffic on safety at the most heavily traveled at-grade crossings will also be quantified, based on statistical accident data, traffic volumes, roadway geometrics, and type of traffic control.

The origins of shipments to the landfill via the truck mode of transport are less certain than the likely origins of rail-based shipments. Truck shipments of waste would likely come from a widespread variety of areas located nearer to the landfill than the rail shipments. The highway impact analyses in this report focus on the roadways providing access to the site, including I-10, the two interchanges located nearest the site, and the roads providing access to the site. These roadways are displayed in Figure 3.

Analyses related to the truck mode of transport included assessment of the suitability of the proposed route for truck traffic, and roadway and intersection volume-to-capacity (V/C) ratio and level of service analysis at the locations affected by the landfill. These analyses incorporate the impacts of employee traffic along with the expected truck traffic to the site.

Mitigation measures are developed to address geometric deficiencies in the proposed access routes for both modes of transport. Significant negative impacts, defined to include all impacts resulting in operational deficiencies along the proposed transportation routes, are also mitigated to achieve acceptable operating conditions on these facilities.

In addition to the analysis of project impacts, two project alternatives have been defined. The first alternative eliminates the truck mode of transport, reducing the maximum daily tonnage of trash accepted at the site to 16,000 tons. Although this alternative would eliminate truck traffic, highway conditions would still be affected by the proposed landfill. Employee traffic would increase the overall volume of traffic within the study area, and the effects of this increase on roadway and intersection V/C ratios and levels of service are quantified in this report.

DKS Associates

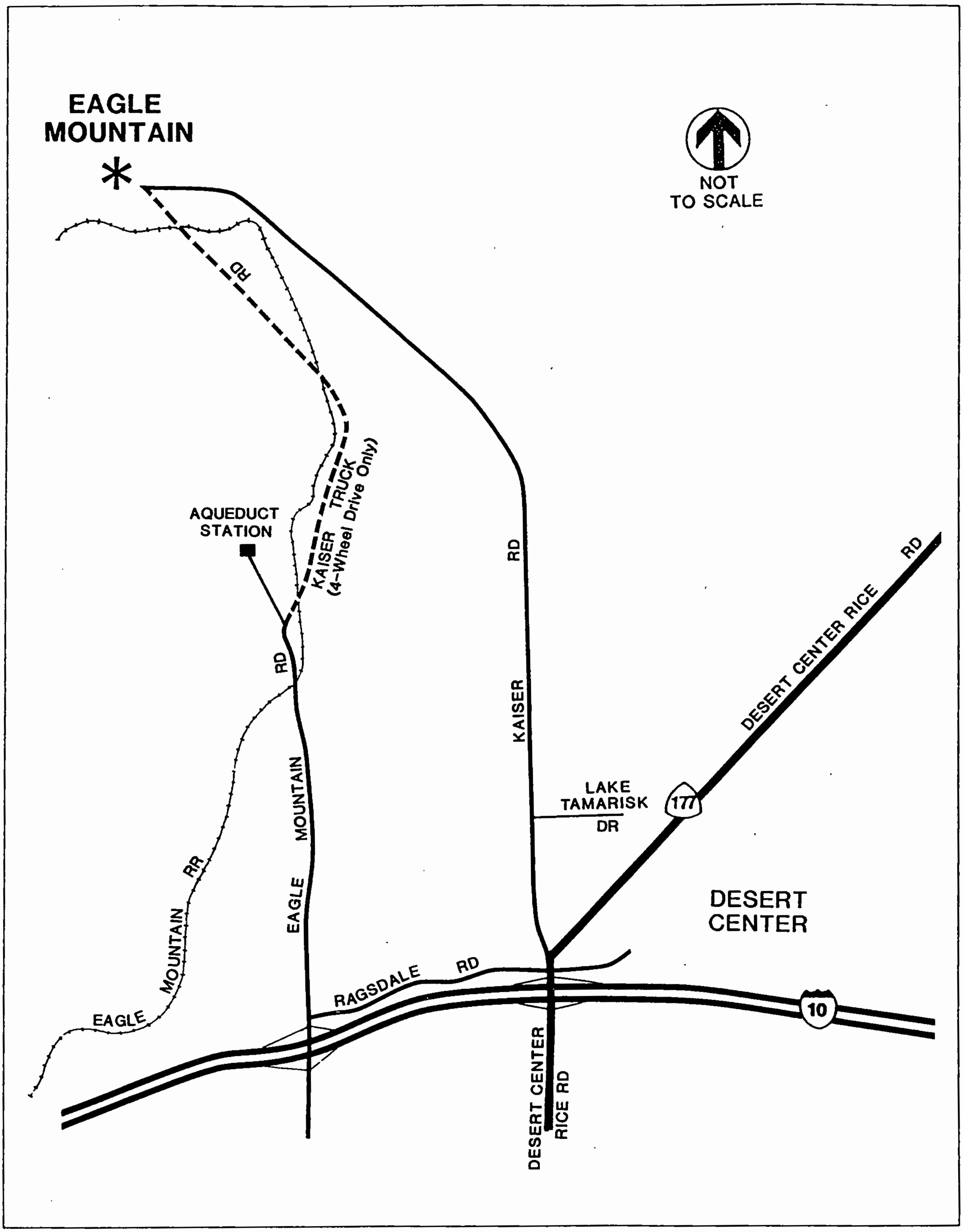


Figure 3
EXISTING ROADWAY AND RAILROAD ACCESS

The second alternative would also reduce the amount of refuse accepted at the site to 16,000 tons daily; however, both rail and truck transport of material would be reduced but not eliminated. The overall effect of this alternative on project impacts is also discussed in this report.

IMPACT ASSESSMENT CRITERIA

This section describes the impact assessment criteria utilized throughout this report. These criteria vary widely; in some instances, nationally recognized assessment criteria are available, while in other cases criteria have been developed based on discussions with the local agency responsible for a particular mode of transport.

RAIL TRANSPORT IMPACT ASSESSMENT CRITERIA

Three aspects of rail transport are assessed in this report: actual rail operations, delays to vehicles at rail/highway crossings, and the hazard or risk of conflict at rail/highway crossings (safety). In all three cases, there are no recognized objective criteria that are nationally recognized.

Rail Operations Impact Assessment Criteria

Rail operations are strictly the responsibility of the Southern Pacific Transportation Company (SPTC), and rail operations were addressed through direct discussions with the SPTC and the California Public Utilities Commission (PUC). The PUC directed questions related to actual rail operations (scheduling, etc.) to the SPTC. A deficient condition has been defined as a situation where SPTC has indicated that a proposed schedule is not feasible.

Rail At-grade Crossing Delay Impact Assessment Criteria

An important concern of the public when assessing the impacts of increased train traffic is the delay to highway traffic when the train crosses an at-grade crossing. A detailed and complex set of equations is utilized in the report *The Feasibility of Hauling Solid Waste by Railroad from the San Gabriel Valley to Remote Disposal Sites* (Southern California Association of Governments, April, 1988). These equations form the basis of the at-grade delay analyses described in this report.

The delay at an at-grade crossing is a function of the time of crossing blockage, highway traffic volume, and the rate of vehicle queue discharge after the train has passed. The form of this relationship is:

$$\text{Delay} = T_B^{2} * (q/2) * (1-q/d);$$

Where:

Delay	=	Total minutes of vehicle delay
T_B	=	The length of time the crossing is blocked by the train
q	=	Vehicle arrival rate, vehicles per minute
d	=	Vehicle departure rate, vehicles per minute

The vehicle departure rate is a function of the number of traffic lanes available and the percentage of trucks in the traffic stream. Trucks are assumed to constitute 10% of the overall traffic stream during the late night and early morning hours, when the unit trains are expected to be traveling between the transfer stations and Eagle Mountain. This assumption results in a departure rate of 1,520 vehicles per hour per lane following passage of the trains.

The hourly vehicle arrival rate during the proposed hours of operation is assumed to equal 4% of the overall average daily traffic. This is conservative, as approximately 20% of average daily traffic typically occurs during the two peak hours of the day, and distribution of the remaining traffic evenly over the remainder of the day would result in 3.6 percent for each hour. Typically, there are several hours of elevated traffic volume during the course of the day, with somewhat lower volumes during the proposed hours of operation.

The calculation of the length of time during which the crossing is blocked by the train (blockage time) is somewhat more complex. There are two components to be calculated, one of which is a constant, and one of which is related to the characteristics of both the crossing and the train itself. The constant component of the blockage time is based on the lead and lag time of the crossing closing. A lead time of 28 seconds and a lag time of eight seconds are typical, or a total of 0.603 minute.

The variable component of the gate blockage time is equal to the span of time that starts when the front of the train enters the near side of the intersection and ends when the back of the train passes the point beyond the intersection that signals the end of the blockage to the crossing mechanism. The distance beyond the intersection is normally 50 feet, and this value will be used in the subsequent calculations. Algebraically, the overall gate blockage time is:

$$T_B = .603 + ((50 + l + w)/v);$$

Where:

- l = length of the train in feet
- w = roadway width at the crossing in feet
- v = train speed in feet per second.

Train speeds were determined based on SPTC timetables for train traffic along the various segments. The width of each roadway was either obtained from the jurisdiction responsible for the roadway in the vicinity of the crossing or was estimated based on the number of lanes and assuming a typical lane width of twelve feet per lane.

In addition to the total delay incurred at each crossing, the number of vehicles delayed is also of interest. Based on the variables defined previously, the total number of vehicles delayed at a crossing is:

$$\text{Vehicles Delayed} = T_B * q/(1-q/d).$$

Once the total delay and the number of vehicles delayed are computed, it is quite simple to calculate the average delay per vehicle, which will also be used to describe the impacts related to the added train traffic.

The reports reviewed did not establish a benchmark criteria for delay related deficiencies, but discussions with the PUC resulted in their identifying locations along the heavily utilized Alameda Corridor which serves the Port of Los Angeles as the only area where problematic delays occur in this region. The delays incurred at crossings along this corridor by nighttime operations of a single refuse train under existing conditions will, therefore, serve as the benchmark for identifying deficient conditions on the primary segment of the rail line. These benchmark delays are on the order of one to three hours of cumulative delay (all vehicles impacted). The delays on the primary segment will also be compared to delays on other parts of the system studied.

Rail Safety Impact Assessment Criteria

The most widely utilized measure of rail safety at at-grade crossings is known as the hazard index. This index is intended to identify the relative estimated hazard among the crossings included in the analysis. It is not intended to specifically identify high or low probability of accidents, nor is it meant to predict rail/vehicular traffic accidents due to the presence of increases in train activity.

The United States Department of Transportation has funded considerable research into the subject of safety at at-grade crossings. Although numerous hazard indices have been developed, a study of eleven different indices of varying complexity (i.e., some included historic accident information, others were based on probability distribution formulations, etc.) concluded that all of the indices studied gave basically the same rankings (Bezkorovainy, Georgy, and Holsinger, Robert - *Optimum Hazard Index Formula for Railroad Crossing Protection for Lincoln, Nebraska,* 1967, 18 pp.). Furthermore, the following equation best fit the composite arithmetic average of all the rankings as determined by the eleven different hazard index formulae:

$$H = V * T * P_f$$

Where:

H = The calculated hazard index
V = The average twenty-four hour traffic volume
T = The average twenty-four hour train volume
P_f = The protection factor

The protection factor is a function of the type of protection present at the crossing; the applicable values of this factor are presented in Table 1. The protection values have been developed based on empirical studies of the effectiveness of various types of warning devices.

Table 1
Protection Factor Values

Protection Type	Protection Factor
Crossbuck	1.00
Signs	1.00
Wigwag	0.34
Flashing Light	0.20
Automatic Gates	0.11

The PUC, which is responsible for rail activities and safety in California, was consulted regarding the identification of locations with safety deficiencies. The identification of locations targeted for improvements is performed on the basis of subjective rather than objective criteria. Although they often perform a similar hazard index calculation, this is done for informational purposes only. Deficient locations are identified through meetings involving the PUC, local agencies, the California Department of Transportation (Caltrans) and the railroad.

The PUC list of locations targeted for improvement currently includes approximately 600 crossings, or 7% of the 8,700 crossings in California. Based on this fact, a potentially deficient condition will be noted whenever a crossing on the primary segment falls within the top 7% of the grade crossings studied.

The potential impact of the project from a safety perspective has also been discussed directly with the PUC.

ROADWAY IMPACT ASSESSMENT CRITERIA

Two types of analyses have been conducted as part of the roadway impact assessment: roadway segment analysis and intersection operations analysis. The roadway segment analysis and the intersection operations analysis are both based on methodologies presented in the *Highway Capacity Manual* (Special Report 209, Transportation Research Board, Washington, D.C., 1985). The *Highway Capacity Manual* (HCM) is the most widely recognized standard for roadway impact analysis in the nation, and provides analysis methodologies explicitly intended for assessing the types of conditions found in the study area.

Roadway Segment Impact Assessment Criteria

The roadway segments serving the proposed project site have been analyzed using the analysis methodology for two-lane highways, which is defined simply as a two-lane roadway having one lane for use by traffic in either direction. The methodology can be used to determine the level of service (LOS) for a segment of roadway based on the following characteristics:

- The traffic volume
- The directional distribution of traffic
- The roadway lane and shoulder widths
- The proportion of heavy vehicles in the traffic flow

A maximum service flow rate is developed for each individual segment based on the above characteristics that corresponds to LOS A through LOS F, with LOS C being the normal limit of acceptable operations in non-urbanized areas. The service flow rates calculated in this fashion are compared to the actual or projected traffic volume on the segment to determine the segment's LOS. Any resulting level of service worse than LOS C is defined as a deficient condition, and a significant impact occurs wherever either a deficiency is created by the project or when the level of service at a previously deficient location degrades (i.e., LOS E to LOS F).

Unsignalized Intersection Impact Assessment Criteria

Unsignalized intersection operating conditions can also be assessed utilizing techniques outlined in the *1985 Highway Capacity Manual.* A level of service (LOS) can be determined utilizing the methodology outlined in the manual for unsignalized intersections. Level of service is reported on a scale of A to F, with A representing excellent operating conditions and F representing extremely congested conditions. The definition of a significant impact is identical to the definition for roadway segments.

At unsignalized intersections which are controlled by stop signs, a level of service is measured for each traffic movement which is controlled by a stop or yield sign. For example, the minor street through and left-turn movements must first stop and then proceed only when the major street cross traffic is clear. Levels of service are therefore calculated for the minor street movements based on the availability of gaps in major street traffic that will allow minor street traffic to proceed through the intersection. The major street traffic is never forced to stop and experiences no delay; therefore no level of service calculation is required. The number of gaps in major street traffic not utilized by minor street traffic is referred to as the reserve capacity. The relationship between reserve capacity and level of service is summarized in Table 2.

Table 2
Definition of Level of Service Interpretation at Unsignalized Intersections

Level of Service	Description	UNSIGNALIZED Reserve Capacity (Vehicle/hour)
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	400+
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	300-399
C	Good operation. Occasionally drivers may have to wait more than 60 seconds, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted. This level is typically associated with design practice for peak periods in non-urbanized areas.	200-299
D	Fair operation. Cars are sometimes required to wait more than 60 seconds during short peaks. There are no long-standing traffic queues.	100-199
E	Poor operation. Some long-standing vehicular queues develop on critical approaches to intersections. Delays may be up to several minutes.	0-99
F	Forced flow. Represents jammed conditions. Back-ups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop and go type traffic flow.	<0

Source: *Highway Capacity Manual*, Special Report 209, Transportation Research Board, Washington D.C., 1985.

3. Existing Conditions

3. Existing Conditions

The existing conditions along the proposed rail and highway routes serving the Eagle Mountain landfill were assessed to provide a basis for determining the impacts of the proposed project. The conditions along the rail route are discussed first, because of the greater quantity of materials to be shipped by rail, followed by the discussion of existing highway conditions.

RAIL ROUTE EXISTING CONDITIONS

The rail route existing conditions section describes the characteristics of the rail lines, and the routes that would be traveled by trains between the transfer stations and the Eagle Mountain landfill. This section also estimates current at-grade crossing delays caused by a train with characteristics similar to the proposed refuse unit trains. Finally, an existing conditions relative hazard index is developed, incorporating the characteristics of the at-grade crossings and current traffic levels on both the highway and rail line at each crossing.

Rail Line Description

The rail lines serving the various transfer stations identified in the introduction of this report have been broken down into a total of eight discrete segments for the purposes of this analysis. The segments were identified based on the locations of the transfer stations along the rail lines and key junction points where trains would be switched on or off a particular route. These segments are displayed in Figure 4. The existing usage and characteristics of the rail line segments are discussed individually, while Table 3 summarizes the most important characteristics of each segment. The characteristics of the at-grade crossings are discussed within the individual segment descriptions, while Appendix A contains a comprehensive listing of the existing conditions at all at-grade crossings.

A total of 268 miles of rail line were analyzed during this study, with 231 at-grade crossings identified along their length, or an average of one at-grade crossing every 1.2 miles. Data pertaining to rail and highway traffic volumes and crossing geometric conditions were obtained from a variety of sources, including the Southern Pacific Transportation Company, the California Public Utilities Commission (PUC), the Southern California Association of Governments (SCAG), Caltrans and local city traffic surveys. Data was obtained for over 97% of the crossings. Average daily train volumes ranged from 2 to 50 trains per day, while traffic volumes on the roadways crossing these rail lines at-grade ranged from less than 1,000 vehicles daily to over 43,000 vehicles daily.

Table 3
Rail Line Segment Characteristics

Segment	From/To	Number of Crossings	Length	Train Volumes Low	Train Volumes High	Train Volumes Median	Average Distance Between Crossings	Average Daily Volume
1	Ferrum/Colton Yard	31	146	28	50	35	4.7	2,200
2	Colton Yard/ Industry Transfer Station	20	33	28	35	35	1.6	8,700
3	Industry Transfer Station/ Bassett Junction	9	11	28	28	28	1.2	10,100
4	Bassett Junction/ SP's LATC	20	14	28	28	28	0.7	14,100
5	SP's LATC/ N. Orange Co.	50	21	4	28	12	0.4	12,900
6	Colton Yard/ La Verne Transfer Station	74	30	2	8	2	0.4	3,700
7	La Verne Transfer Station/ Irwindale Transfer Station	19	9	4	4	4	0.5	3,000
8	Irwindale Transfer Station/							

DKS Associates

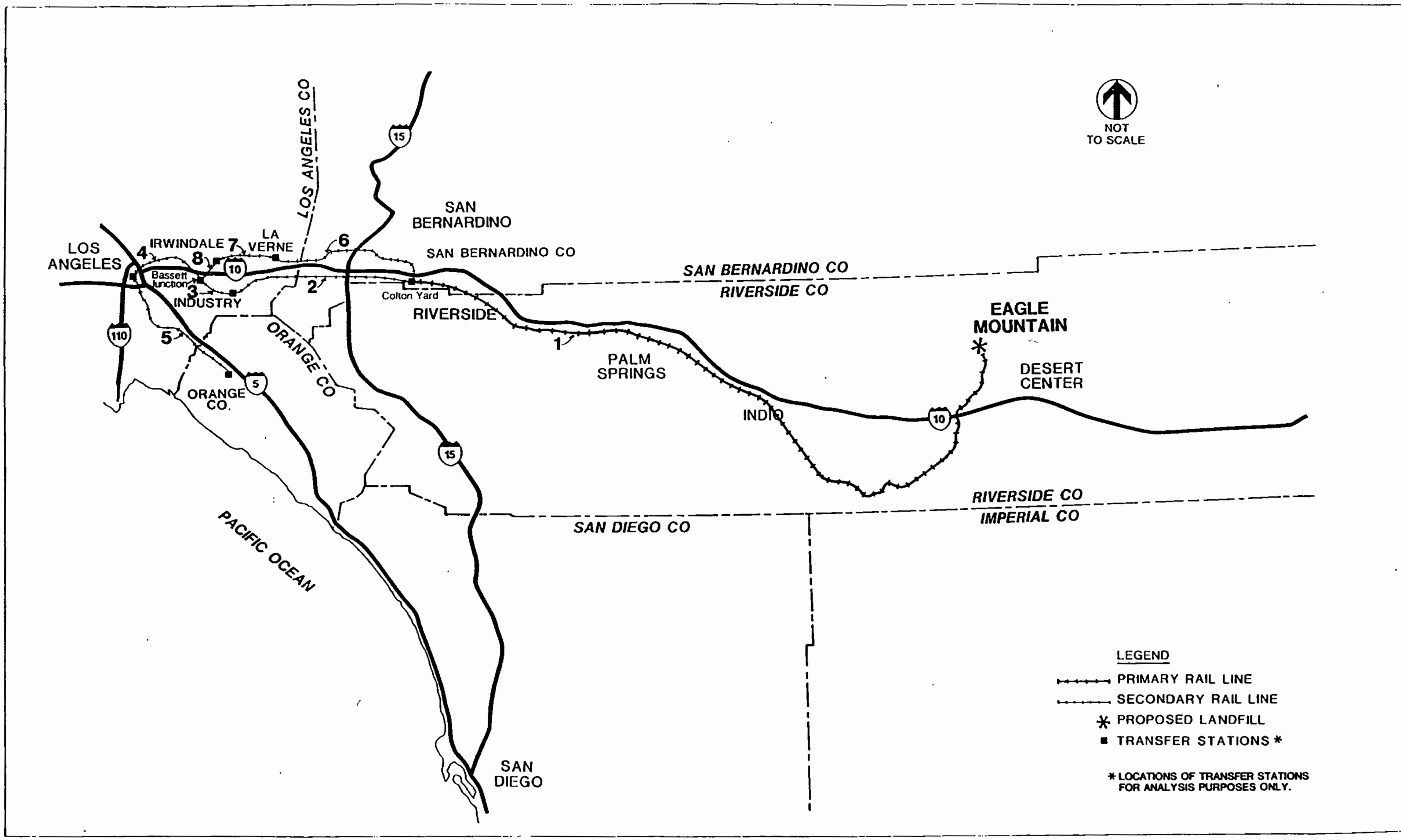


Figure 4
RAIL LINE ANALYSIS SEGMENTS

Segment 1: Eagle Mountain to the Colton Yard/San Bernardino Transfer Station. This 146-mile segment is the primary area of interest in this study, as all trains destined for the Eagle Mountain landfill would use this section of rail line to access the site. The segment is located in the least populated part of the study area, and consists of 52 miles of privately owned spur (the Eagle Mountain Railroad) and 94 miles of rail line owned by the Southern Pacific Transportation Company. The Southern Pacific's section is part of the Yuma/Alhambra main line. Although the segment is the longest of those studied, only 31 at-grade crossings were identified along its length. The average roadway daily traffic volume was 2,200 vehicles per day, the lowest of all segments studied.

The average distance between crossings is 4.7 miles, the highest of all segments identified. Even when the 52-mile private spur (which has no at-grade crossings) is eliminated from consideration, the average distance between at-grade crossings is still over three miles. This is nearly twice as high as the next highest average distance between at-grade crossings for the other seven segments.

Daily train volumes along this segment range from 28 to 50 trains daily, with a median average of 35 trains. Train speeds on this segment are fairly high, ranging from 30 to 60 miles per hour (MPH).

This segment is considered in the greatest detail, because all trains, no matter what their origin, would use this segment to access the Eagle Mountain landfill. There are no at-grade crossings for the next 15 miles east of the Colton yard, so the San Bernardino County transfer station could be located in a wide geographic area without affecting the validity of the impact analysis.

Segment 2: Colton Yard to the Industry Transfer Station. This segment is the second longest section within the study area, and it is also a part of the Southern Pacific Transportation Company's (SPTC's) Yuma/Alhambra line. Twenty at-grade crossings were identified along its 33-mile length, or one at-grade crossing every 1.6 miles. The average at-grade crossing roadway volume on this segment was 8,700 vehicles per day, significantly higher than the average for the previous segment, and slightly higher than the overall observed average of 7,200 vehicles per day.

This is the second most heavily utilized rail line in the study area, with 28 to 35 trains per day using various portions of this segment. Most refuse trains would also use this segment of rail line, although shipments from Irwindale or La Verne could travel an alternate route to the Colton Yard. Both possible routes to and from these two transfer stations were assessed in the impact analysis. Train speeds on this segment are consistently high, ranging from 60 to 65 MPH.

The roadway volumes at the at-grade crossings along this segment range from 900 vehicles per day to 20,000 vehicles per day, with the majority of crossings carrying between 4,000 and 10,000 vehicles per day.

Segment 3: Industry Transfer Station to Bassett Junction. This segment runs approximately 11 miles, from the east end of Industry to the west end of Industry, near Vineland Avenue. Again, it is a piece of the SPTC's Yuma/Alhambra line. Bassett Junction is the point where this line connects with the SPTC's Baldwin Park line.

Nine at-grade crossings are located along this segment, with roadway volumes ranging from less than 1,000 vehicles per day to over 28,000 vehicles per day. Daily vehicular traffic volumes at the at-grade crossings averaged 10,100 vehicles per day on this rail segment. The average distance between crossings on this segment is 1.2 miles, somewhat less than the average distance between crossings on the segments previously described.

The average number of daily trains along this segment is very consistent, with 28 trains per day reported at each of the at-grade crossings. The train speed for through traffic on this segment of rail line is 60 MPH.

Segment 4: Bassett Junction to the Southern Pacific's Los Angeles Transportation Center. This segment, the final part of the Alhambra/Yuma line included in the study, is approximately 14 miles long, and terminates at the SPTC's major yard facility in East Los Angeles. This yard is located just east of the Los Angeles River channel and just north of the San Bernardino Freeway (I-10). There are a total of 20 grade crossings on this segment, located an average of 0.7 mile apart. The daily volume of train traffic is, again, very consistent along the length of this segment, with an average of 28 trains per day reported at each of the at-grade crossings. Train speeds begin to drop on this segment, ranging from 60 MPH down to 20 MPH.

Roadway traffic volumes at the at-grade crossings located along this segment are somewhat higher than the roadway volumes previously discussed. These volumes range from a low of 2,000 vehicles per day to over 30,000 vehicles per day at several crossings. The 14,100 vehicles per day average for at-grade crossings along this segment is the highest in the study area.

Segment 5: The Southern Pacific's Los Angeles Transportation Center to the Northern Orange County Transfer Station. This segment is 21 miles long and is comprised of pieces of the SPTC's San Pedro and Santa Ana lines. The total of 50 at-grade crossings identified result in an average of only 0.4 mile between crossings, the lowest of all segments studied. The roadway traffic volumes at the at-grade crossings are also relatively high, ranging from less than 1,000 vehicles per day to over 43,000 vehicles per day, the highest volume of roadway traffic in the study area. The average at-grade crossing vehicular volume on this segment is 12,900 vehicles per day, second highest in the study area.

Train speeds along this segment are generally low, ranging from just ten miles per hour at the north end of the segment to a high of 20 miles per hour at the southern end of the segment. The average daily number of trains ranges from four to 30 trains per day, with most crossings experiencing ten to twelve train crossings per day.

Only trains to and from the northern Orange County transfer station would utilize this segment. The last at-grade crossing included on the segment is at Stanton Avenue in Buena Park. Another at-grade crossing on the Santa Ana line does not exist before Loara Street in Anaheim, a distance of 4.5 miles. Thus, the transfer station could again be located in a broad geographic area without affecting the results of the impact analysis summarized in this report.

Segment 6: The Colton Yard to the La Verne Transfer Station. This segment of rail line could potentially serve shipments from both the La Verne transfer station and the Irwindale transfer station. There are a total of 74 at-grade crossings along this 30-mile length of rail line, or one crossing every 0.4 mile. The average vehicular traffic volume for at-grade crossings along this segment is 3,700 vehicles per day, well below the overall observed average.

The number of trains traversing this segment is also below the average observed elsewhere in the study area. Only two to eight trains per day traverse the various at-grade crossings along this segment, with only two trains per day at most crossings. Train speeds are only 10 MPH on this segment.

Segment 7: The La Verne Transfer Station to the Irwindale Transfer Station. This segment of rail line is only nine miles long, and might be used by shipments from the Irwindale transfer station (eastbound) or the La Verne transfer station (westbound). The traffic volumes at the at-grade crossings on this segment are again lower than the overall study area average. The average along this segment is 3,000 vehicles per day, lower than any other segment except Segment 1.

There are an average of two at-grade crossings per mile along this segment, ranking third among the segments analyzed. There are a total of 19 crossings along this nine-mile long segment of railroad. Train traffic along this segment is very consistent, with an average of four trains per day reported at each of the at-grade crossings. Travel speeds on this segment of rail line are again 10 MPH.

Segment 8: The Irwindale Transfer Station to Bassett Junction. This is the final segment of railroad included in the Eagle Mountain Transportation Study. Only 4.5 miles long, this segment connects the Baldwin Park line of the SPTC's rail network to the Alhambra/Yuma line. Usage of this segment would be similar to the usage described for Segments 6 and 7, with shipments possible from either the Irwindale Transfer Station or the La Verne Transfer Station.

The average traffic volume at the at-grade crossings along this segment is 7,600 vehicles per day, slightly higher than the overall study area average. The at-grade crossings are an average of 0.6 mile apart, approximately half the study area average. Train traffic along this segment, again, averages four trains per day. Train speeds along this segment are limited to 20 MPH along the entire 4.5-mile long segment.

Existing At-grade Crossing Delays

Under existing conditions, most crossings would experience relatively low delays during the passage of a refuse train. The description of delays here and in the impact analysis focuses on the at-grade crossings located along the primary study segment (Segment 1), and includes all locations along other segments where a total of at least one-half hour of vehicle delay would occur under existing conditions during the passage of a typical refuse train. This is the equivalent of the delay at a minor signalized intersection, serving 1,000 vehicles during a single peak hour, operating at LOS A (excellent operating conditions), with only two seconds of delay to each vehicle. On rail segments where this criteria was not met, a minimum of the two highest delay locations has been included in the analysis.

Along the primary segment, the total delay caused by the passage of a single train with the proposed configuration of the unit trains traveling to the site would be 0.94 vehicle-hour. The maximum number of vehicles delayed at a single crossing is approximately twelve, at Hunts Lane in Colton and at Monroe Street in Indio. The highest total vehicle delay at any one crossing on this segment would be approximately 0.17 hour, which again occurs at the crossing of Monroe Street in Indio. In general, per vehicle delays would typically be on the order of one minute for each vehicle.

Total delays at crossings along other segments range as high as 3.5 hours (Slauson Avenue on Segment 5), where a total of more than 120 vehicles would be delayed by the passage of a single unit train. This would cause an average delay of 1.7 minutes to each vehicle affected by the train's passage. Although the Slauson Avenue crossing is not the highest volume crossing in the study area, a combination of low train speeds and fairly high traffic volumes (average daily traffic at this crossing is 28,300) results in the highest overall delay of any crossing in the study area.

Based on this existing conditions analysis, a total of 95 crossings will be analyzed in the impact section of this report (all 31 crossings along the primary segment and 64 locations along other segments within the study area).

Rail Line Existing Conditions Relative Hazard Index

A relative hazard index has been calculated for each of the at-grade crossings on the primary rail segment and all secondary rail segment crossings included in the delay analysis; these locations are also likely to involve the greatest number of conflicts between trains and vehicular traffic.

The actual values of the calculated hazard indices for existing conditions range from 200 to 222,900. The maximum value of the hazard index occurs at Pine Street, on one of the potential haul routes serving locations in the San Gabriel Valley. The type of protection at this location is warning signage, and an average of 28 trains per day use this crossing, as do 7,961 vehicles.

The highest hazard index value on the primary segment is found at Hunts Lane in Colton (H = 55,900), while the highest calculated hazard index in Riverside County is found at Monroe Street in Indio (22,900), closely followed by 22nd Street in Banning (21,800). These two locations rank 27th and 28th, respectively, among the locations included in this analysis. The existing protection at both of these crossings is gate protection, the safest form of protection available at an at-grade crossing.

The highest hazard location in Riverside County not protected by gates is found at 50th Avenue in Coachella. This location, with a hazard index of 6,400, is ranked 50th overall. Currently, flashing lights are used to protect this location.

This completes the description of existing conditions along the rail lines within the study area. Study area roadway existing conditions will be described in the next section.

TRUCK ROUTE EXISTING CONDITIONS

The highway existing conditions section discusses the highway network that would be used to access the landfill. Existing roadway geometrics are described, with particular attention to truck related characteristics, such as tight turning and narrow lane widths.

The highway existing conditions section also describes existing traffic volumes in the vicinity of the project site, and analyzes current peak hour operating conditions.

Existing Geometrics and Traffic Volumes

As previously mentioned, truck traffic to the site will be generated from a variety of areas. Due to the widespread wasteshed to be served by truck and the fact that exact transfer station locations are not yet identified, it is not possible to quantify all trucking related impacts from point of origin to the Eagle Mountain landfill site. The I-10 Freeway is the first route where all truck trips to the site will converge, and, therefore, is one major focus of the analysis. The other key routes included in the truck impact study are Eagle Mountain Road, Kaiser Road, Desert Center Rice Road and Ragsdale Road. A description of the physical and operational characteristics of each route follows. Figure 5 displays Average Daily Traffic (ADT) volumes on each facility. These counts were taken during the month of November 1989, except for the freeway volumes, which were counted by Caltrans in 1988. The traffic counts are included in Appendix B.

Interstate 10 Freeway. This freeway facility runs from the Los Angeles area through a portion of San Bernardino County into Riverside County and past the Eagle Mountain site. It is the major access route for all automobile and truck traffic originating at or destined to the project

DKS Associates

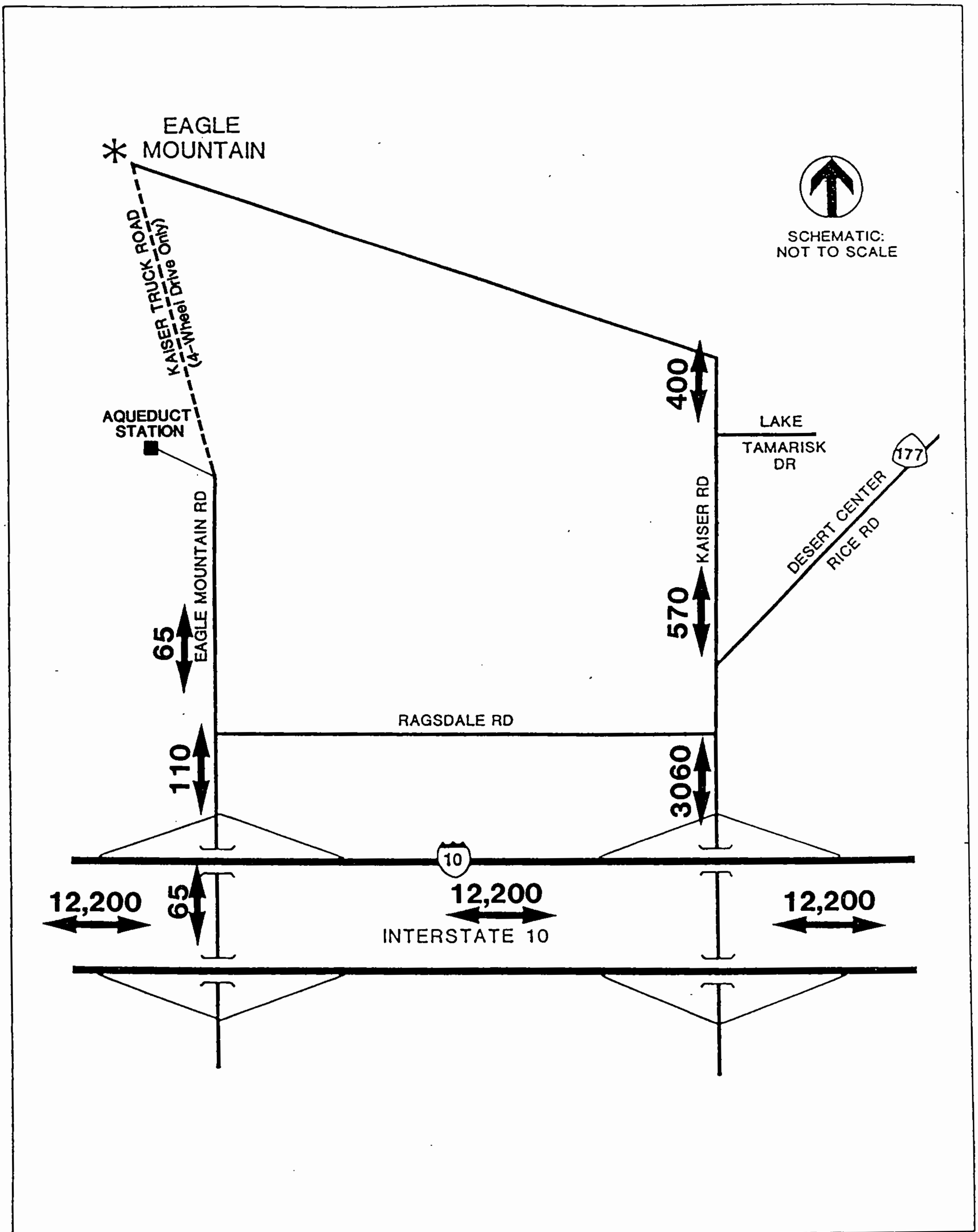


Figure 5
EXISTING AVERAGE DAILY TRAFFIC

site. Access to the Eagle Mountain/Desert Center area is provided via two full-diamond interchanges with Eagle Mountain Road and Desert Center Rice Road. Near the site, I-10 has two lanes in each direction, and carries an average daily traffic volume of 12,200 vehicles, with a peak hour volume of 850 vehicles (per Caltrans 1988 Traffic Volume Census).

Eagle Mountain Road. As currently proposed, Eagle Mountain Road would be the main surface roadway access route for truck traffic between I-10 and the project site. The road runs from south of I-10 to Kaiser Truck Road and the Eagle Mountain Aqueduct station located approximately seven miles north of the freeway. A full-diamond interchange (on and off ramps in both the eastbound and westbound directions) is provided at I-10. Eagle Mountain Road is not a through road south of the freeway. Under the freeway overcrossing, it carries one lane in each direction within a 40-foot curb-to-curb cross section. North of the westbound ramps, it narrows to 32 feet, curb-to-curb. Ragsdale Road intersects Eagle Mountain Road in a "T" intersection immediately north of the westbound freeway ramps. The existing traffic volumes on Eagle Mountain Road and the freeway interchange are very low because the roadway primarily serves only traffic related to the aqueduct. The average daily traffic volume on Eagle Mountain Road north of the freeway ramps is 110 vehicles, while north of Ragsdale Road it drops to 65 vehicles.

Kaiser Road/Desert Center Rice Road Interchange. Kaiser Road runs from north of the freeway north to the existing Eagle Mountain mine site (approximately eleven miles from the freeway). It intersects Desert Center Rice Road north of the freeway. Access to Kaiser Road from the freeway is provided by the Desert Center Rice Road interchange. Under the freeway overcrossing, the roadway is 40 feet wide curb-to-curb. The average daily traffic volumes at the interchange and on Kaiser Road are considerably higher than Eagle Mountain Road due to traffic related to the services in Desert Center, the residential population of Lake Tamarisk (approximately 550 people), the operations at the Eagle Mountain site, and the existing school operations. Between Ragsdale Road and the freeway, Desert Center Rice Road carries 3,050 vehicles per day. Between Desert Center Rice Road and Lake Tamarisk Drive, Kaiser Road carries 570 vehicles per day; and north of Lake Tamarisk Drive it carries 400 vehicles per day.

Ragsdale Road. Ragsdale Road is a short, two-lane roadway which connects Eagle Mountain Road with Kaiser Road. It runs immediately north of and parallel to the freeway. It is 36 feet wide, except at several bridges where it narrows to 24 feet.

Existing Roadway Segment Operations

Level of service calculations have been performed for the following three roadway segments:

- Eagle Mountain Road north of Ragsdale Road
- Kaiser Road north of Desert Center Rice Road
- Kaiser Road north of Lake Tamarisk Drive

The results of this analysis are summarized in Table 4, and indicate that acceptable operations exist on all of these roadway segments.

Existing Intersection Operations

The intersections most likely to be impacted by truck and automobile traffic related to the project are Eagle Mountain Road/Ragsdale Road, Eagle Mountain Road/I-10 interchange and Desert Center Rice Road/I-10 interchange. These are the intersection locations which will experience the greatest increase in traffic volume due to the project, and they have been analyzed to determine existing and forecast future operating conditions.

The level of service analysis for the interchanges of I-10 with Eagle Mountain Road and Desert Center Rice Road indicates that LOS A (excellent) conditions exist for all movements during the peak hour. The intersection of Eagle Mountain Road/Ragsdale Road is also operating at LOS A. Traffic operations analysis worksheets are included in Appendix C.

Table 4
1989 Existing Conditions
Roadway Segment LOS Analysis Summary

Segment	Peak Hour Volume	LOS
Eagle Mountain Rd. n/o Ragsdale Rd.	12 (5:45 - 6:45 AM)	A
Kaiser Rd. n/o Desert Center Rice Rd.	51 (1:00 - 2:00 PM)	A
Kaiser Rd. n/o Lake Tamarisk Dr.	49 (4:00 - 5:00 PM)	A

4. Future Year No-Build Conditions

4. Future Year No-build Conditions

The proposed landfill is not expected to begin operating at full capacity until 1995. This section of the report forecasts changes in existing conditions within the study area between now and 1995, which will allow comparison of conditions related to the transportation infrastructure both with and without the project. The estimation of project impacts will then be based on this comparison.

FUTURE CONDITIONS RELATED TO RAIL TRANSPORT

Rail line usage tends to change more slowly than highway usage, and significant changes in the amount and composition of rail traffic are not expected over the next five years. Continued growth in the southern California region is expected to result in increased traffic volumes at the at-grade crossings within the study area. The large region encompassed by the study area requires a generalized approach to estimating traffic growth within the study area.

The Southern California Association of Governments (SCAG) periodically publishes projections of expected changes in the socioeconomic characteristics (i.e., population and employment) contributing to changing travel demand within the various parts of the region. SCAG's *1984 Regional Transportation Plan* specifically addresses growth in travel demand through the year 2000 for 23 individual subregions within SCAG's jurisdiction. Volume Three of the Plan discusses the characteristics of each subregion individually, including travel demand. The report states that the home-based work trip is a good indicator of future traffic levels, and the discussion of each subregion is focused on this type of trip.

The number of home-based work trip ends has been used to estimate average annual growth in traffic along each of the rail segments described in the existing conditions section of this report. The development of these growth rates is summarized in Table 5.

Detailed information is available for the majority of the rail segments analyzed. The one exception is the section of Segment 1 located in Riverside County. This section is located primarily within the desert region of Riverside County, and detailed travel demand estimates for this region are not available from SCAG's travel demand model.

The report does indicate that the amount of urbanized land in the desert subregions of SCAG's jurisdiction are expected to double between 1980 and 2000. The growth rate for at-grade crossings located along this section of Segment 1 is based on the assumption that doubling the amount of urbanized land will result in a doubling in the amount of traffic on existing surface streets during this 20-year time period.

Table 5
Study Area Traffic Growth Rate Summary

Segment	SCAG Subregion	Home/WorkTrip Ends 1980	Home/WorkTrip Ends 2000	Ratio	Annual Growth
1, Riverside Co.	Riverside County Deserts	N/A	N/A	2.0*	3.5%
1, San Bernardino Co.	E. San Bernardino Valley	314,710	518,528	1.648	2.5
2, All	Chino Basin	313,477	631,433	2.014	3.6
3, All	East San Gabriel Valley	801,175	925,111	1.155	0.7
4, All	Central L.A. Glendale/Pasadena	4,164,867	4,660,244	1.119	0.6
5, Los Angeles	Long Beach/Downey	1,142,369	1,456,309	1.275	1.2
5, Orange County	Northwest Orange County	1,838,576	2,426,060	1.320	1.4
6, All	Chino Basin	313,477	631,433	2.014	3.6
7, All	East San Gabriel Valley	801,175	925,111	1.155	0.7
8, All	East San Gabriel Valley	801,175	925,111	1.155	0.7

* Based on general growth in desert regions

Note: SCAG's 1989 Regional Growth Management Report was obtained after the completion of the analysis. Comparison of this report to the data used to develop the growth rates in this table supports the continued use of these growth rates.

Future No-Build Delays to Highway Vehicles at At-Grade Crossings

The projected increases in traffic volumes within the study area will result in somewhat increased delays to vehicles when a train crosses any of the at-grade crossings located within the study area.

Overall delays related to the passage of a single train of the same length as the proposed unit trains traveling to Eagle Mountain would result in a total of 1.16 vehicle-hours of delay along the primary analysis segment, an increase of nearly 25% when compared to the estimate for existing conditions. The maximum number of vehicles affected at any one crossing on the primary segment would also increase under future no-build conditions. A total of 15 vehicles would be delayed at the Monroe Street crossing in Indio; whereas, only 12 vehicles would be affected under existing conditions. This is again a 25% increase when compared to existing conditions.

Slower growth in the more urbanized regions of the study area results in smaller increases in delay along the other rail segments studied. The maximum delay at a single crossing along the other secondary analysis segments would only increase by seven percent between 1989 and 1995, from 3.5 vehicle-hours of delay to 3.73 hours of vehicle delay. Similarly, the number of vehicles delayed would rise ten percent, from over 120 vehicles to over 130 vehicles.

Rail Line Future No-Build Condition Hazard Index

The increased traffic volumes at study area at-grade crossings also affect the at-grade crossing hazard indices. The recalculated hazard indices range from 250 to 275,600. The highest values are again projected for at-grade crossings located within the heavily urbanized western regions of the study area.

Hunts Lane in Colton is again the highest hazard location along the primary segment, with a calculated hazard index value of 64,800, a sixteen percent increase over the existing condition hazard index at this location. This location has moved from the 13th highest hazard among locations studied to the 11th highest overall ranking. This is a result of the faster growth in this area when compared to the locations it surpassed, which are located in Los Angeles County.

The highest hazard locations along the primary segment in Riverside County did not move up the overall list of at-grade crossings. Monroe Street and 22nd Street are still ranked 27th and 28th. The calculated hazard indices for these locations under future conditions are 28,100 and 26,800, respectively.

Finally, the highest hazard location in Riverside County not already protected by gates is still 50th Avenue in Coachella, where the estimated future no-build condition hazard index is estimated to be approximately 7,800. This value places 50th Avenue in the 47th rank overall. The future conditions without the project at-grade crossing analysis is contained in Appendix D.

FUTURE YEAR NO-BUILD CONDITIONS ON STUDY AREA ROADWAYS

Before quantifying impacts of the proposed project on study area roadways, it is necessary to first identify future conditions without the project. Future year (1995) traffic volumes on surface roadways (all non-freeway) are forecast utilizing data contained in the Southern California Association of Governments (SCAG) Regional Transportation Plan (see previous section for further detail on methodology). Freeway traffic volumes have been forecast based on historical growth trends between 1980 and 1988. Comparison of I-10 traffic volume counts for those years illustrates an overall growth of 48 percent, or a compounded rate of five percent per year. Projecting this rate forward to 1995 yields a freeway growth rate of 41 percent.

Figure 6 illustrates forecast future ADT volumes on roadways near the project site. Roadway operations level of service analyses have been completed for this scenario using the estimated 1995 traffic volumes. The roadway segment operations analysis for this scenario is presented in Table 6, and indicates that acceptable operations are expected under these conditions.

All traffic movements at the I-10 interchanges with Eagle Mountain Road and Desert Center Rice Road and the intersection of Eagle Mountain Road/Ragsdale Road are forecast to operate at LOS A with excellent operating conditions. Appendix E contains the traffic operations analysis worksheets for future conditions without the project.

Table 6
1995 Conditions Without Project
Roadway Segment LOS Analysis Summary

Segment	Peak Hour Volume	LOS
Eagle Mountain Rd. n/o Ragsdale Rd.	15	A
Kaiser Rd. n/o Desert Center Rice Rd.	63	A
Kaiser Rd. n/o Lake Tamarisk Dr.	60	A

DKS Associates

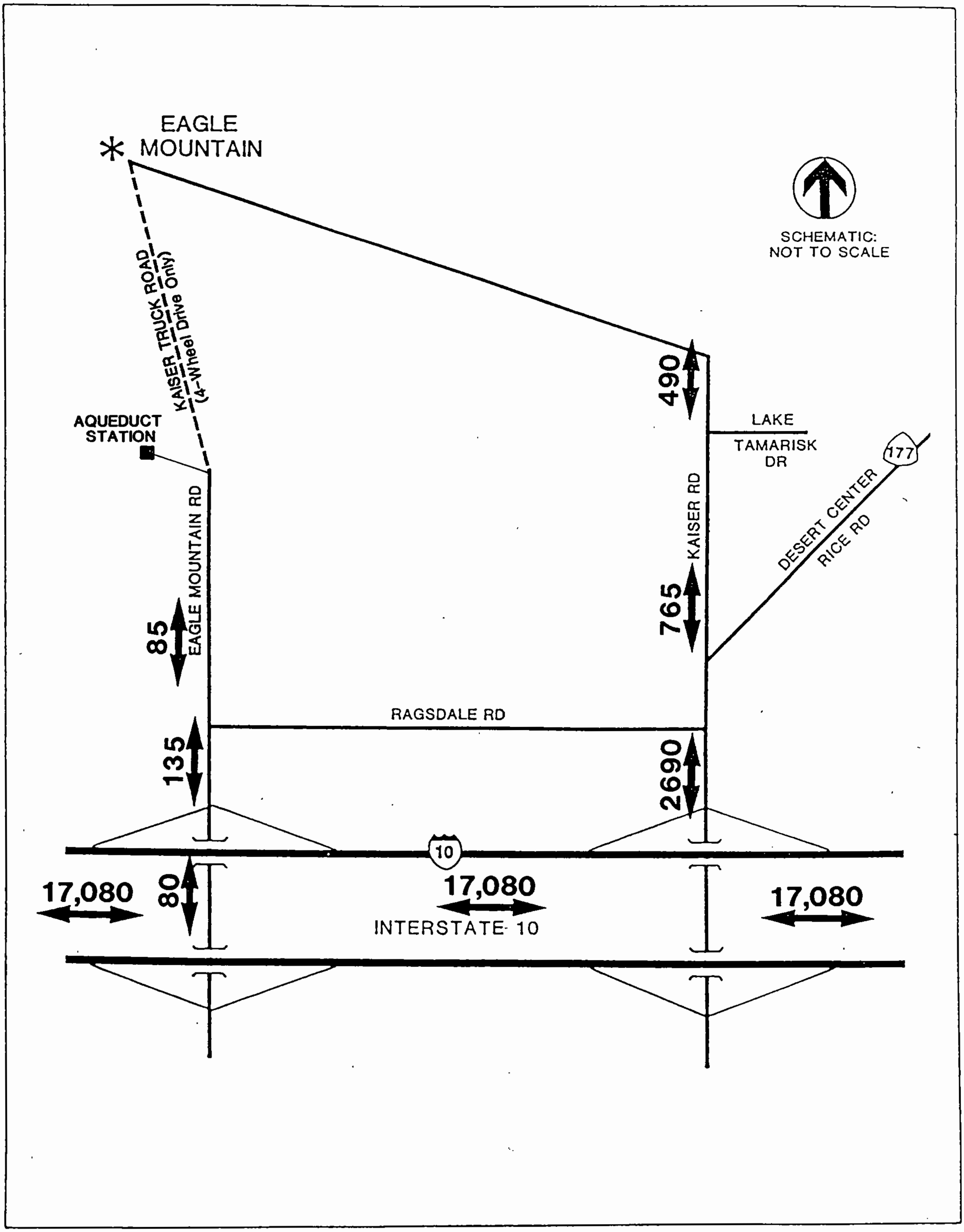


Figure 6
FORECAST 1995 DAILY TRAFFIC WITHOUT PROJECT

5. Project Description and Impact Analysis

5. Project Description and Impact Analysis

The proposed Eagle Mountain landfill is expected to begin operations in the early 1990s, but it will not be operating at capacity until 1995. The project description and impact analysis focus on 1995, as this is the earliest date at which the project can become fully operational. The landfill will accept 20,000 tons of refuse per day when operating at capacity, with 16,000 tons per day delivered by rail, and the remainder arriving at the site via truck.

The project will eventually require realignment of both the Eagle Mountain Railroad and the Kaiser Truck Road. The proposed realignments will not take place until the facility is receiving more than a single refuse train per day. The proposed realignments are displayed in Figure 7. The impacts of these realignments will also be discussed in this section of the report.

This section of the report will follow the same format previously used, wherein the characteristics of the project and their impacts related to rail will be presented first, followed by the characteristics and impacts related to the roadway system. The impacts related to the proposed railroad and roadway realignments will be discussed last.

Project Description - Rail Related Characteristics

A total of 16,000 tons of refuse will be delivered to the site daily via the rail mode of transport, taking advantage of the existing rail spur providing service to the site. The spur, formerly used to carry iron ore from the site to various off-site locations, was originally designed to service trains significantly heavier than the proposed refuse unit trains.

The unit trains will consist of one or more diesel locomotives pulling fourteen articulated rail cars. The rail cars will be "twin stack," as manufactured by Gunderson and Greenbriar Intermodal. Each car will be 256 feet long and consist of five articulating units, each with a well-type configuration capable of holding two 40-foot by 8-foot by 8-foot containers (for a total capacity of ten containers). The estimated length of the overall train, including the engine(s), is 4,000 feet or less. A single train could transport approximately 3,500 tons of waste.

A total of six transfer stations is expected to serve as locations where refuse will be consolidated and loaded into containers for delivery to the site. The locations of these transfer stations were previously presented in Figure 2 (Chapter 1). The quantity of waste to be handled at each transfer station and the resulting average number of shipments per day and per week are presented in Table 7. Although an average of 4.7 shipments per day is projected, the marshalling yard will be equipped to handle the arrival of up to six trains per day.

DKS Associates

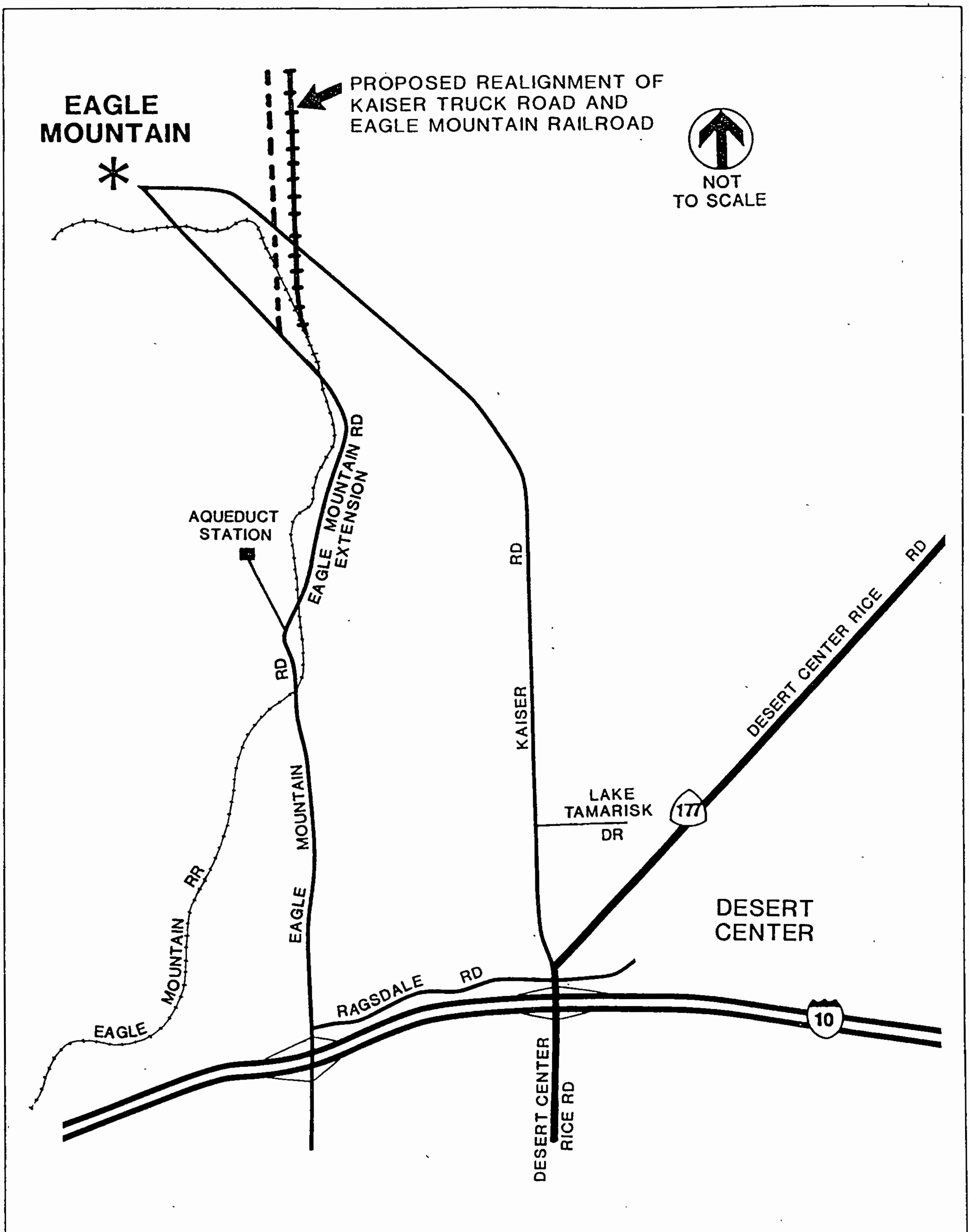


Figure 7
PROPOSED ROADWAY AND RAILROAD ACCESS

Table 7
Average Number of Shipments by Transfer Station

Station	Tons per day (Average)	Average Daily Number of Shipments	Average Weekly Number of Shipments
San Bernardino County	2,000	0.6	3.5
La Verne	2,000	0.6	3.5
Industry	2,000	0.6	3.5
Irwindale	3,000	0.9	5.1
Los Angeles	5,000	1.4	8.6
Orange County	2,000	0.6	3.5

Estimated Project Impacts on At-Grade Crossing Delays

The shipments from each transfer station would use one or more of the rail segments defined to reach the landfill. For instance, the San Bernardino County transfer station would utilize Segment 1 of the rail system to transport refuse to the Eagle Mountain landfill, and the resultant delays would apply only to traffic using at-grade crossings along this rail segment.

The La Verne and Irwindale transfer stations could potentially ship refuse to the landfill via more than a single route. For instance, the containers from the La Verne transfer station could be shipped directly west to Eagle Mountain via Segment 1 and Segment 6, or shipments from this transfer station could also be routed through Bassett Junction to the landfill, via Segments 1, 2, 3, 7, and 8. The routes analyzed in the delay analysis are presented in Table 8.

Each shipment to the landfill would necessitate two one-way train trips. A shipment of full containers to the site and a return train delivering empty containers for reuse at the transfer station would both be required. Multiplying the average daily number of trains by the estimated at-grade crossing delays for each segment traversed on a particular route yields the average daily delay caused by shipments from each transfer station. The average daily delays by transfer station are summarized in Table 9.

Table 8
Routes from Transfer Stations to Eagle Mountain Landfill

	SEGMENTS USED							
Transfer Station	1	2	3	4	5	6	7	8
San Bernardino County	X							
La Verne (Route 1)	X					X		
La Verne (Route 2)	X	X	X				X	X
Industry	X	X						
Irwindale (Route 1)	X					X	X	
Irwindale (Route 2)	X	X	X					X
Los Angeles	X	X	X	X				
Orange County	X	X	X	X	X			

Table 9
Delays Caused by Shipments from Each Transfer Station

Transfer Station	Resulting Average Daily Delay (Hours)
San Bernardino County	1.39
La Verne (Route 1)	43.42
La Verne (Route 2)	11.63
Industry	1.90
Irwindale (Route 1)	76.55
Irwindale (Route 2)	6.01
Los Angeles	9.07
Orange County	47.65

The cumulative delay, caused by the passage of a single train at individual crossings on the primary segment under future conditions with the project, ranges from 0.01 hours to 0.21 hours at the various crossings on the primary segment. This is well below the two-hour delay threshold defined as indicating a deficient condition, indicating that the project causes no significant impact on the primary rail segment.

The shipments from the La Verne and Irwindale transfer stations cause significantly lower delays when routed west through Bassett Junction, then east on the Yuma/Alhambra line to Eagle Mountain. Assuming this routing, shipments from the Orange County transfer station would cause much greater at-grade crossing delays than the other proposed transfer stations. This is a result of the proposed rail route, which traverses some of the most heavily urbanized areas in the region and also requires slower train speeds.

The delays from the Orange County shipments are still relatively minor compared to the delays projected for facilities such as the Ports of Los Angeles and Long Beach; the SCAG report which assesses the potential for rail transport of waste to distant locations states that the high train volumes, slow speeds, and proposed daytime operations result in delay estimates of 100 to 300 vehicle-hours of delay at individual grade crossings.[1] This report also categorizes delays of the magnitude estimated for the Eagle Mountain landfill as "relatively minor."

Another perspective on the significance of the expected total delay incurred along the rail line is also mentioned in the previously cited SCAG report. The report indicates that the approximate average daily delay at the intersection of two arterials carrying 20,000 vehicles per day would be an estimated 300 hours of delay, or five times the total average daily delay caused by the transport of refuse via rail to the Eagle Mountain landfill.

In summary, if the optimal routes from the Irwindale and La Verne transfer stations were used, the total average daily delay at the rail line at-grade crossings is 77.6 hours. Total delay along the primary segment, from Eagle Mountain to Colton, would average approximately 11 hours per day, with a maximum average delay at any grade crossing of between one and two minutes per vehicle along this segment.

Estimated Project Impacts on At-Grade Crossing Hazard Indices

The proposed landfill at Eagle Mountain also increases the hazards inherent whenever a railroad line crosses a highway at-grade. The increase occurs because of the projected increase in the amount of train traffic along the various rail lines. This section quantifies the expected change by recalculating the hazard indices previously presented for future conditions without the project, including the increased rail traffic, and compares the recalculated hazard index values and

---

[1] *The Feasibility of Hauling Solid Waste by Railroad from the San Gabriel Valley to Remote Disposal Sites*, Southern California Association of Governments, April, 1988.

rankings to the values and rankings obtained in the analysis of future conditions without the project.

The recalculated hazard indices ranged from a low of 330 (Cleveland Street in Riverside County east of Coachella) to a high of 275,600 (once again at Pine Street in Pomona). The highest ranking crossing on the primary analysis segment is again Hunts Lane. Although the hazard index value increased by nearly 19%, from 64,800 to 77,000, this location is still ranked 11th overall among the crossings analyzed.

The calculated index for Monroe Street in Indio under future conditions with the project is 37,500, which ranks 22nd overall among crossings analyzed in this study. The at-grade crossing at 50th Avenue in Coachella Valley has a hazard index of 10,500 under future build conditions and is ranked 47th overall. This is the same ranking noted under no-build conditions.

The overall effect of the project on the hazard indices of the study area at-grade crossings is to increase the values by 10 to 30 percent, without significantly altering the overall rankings of the various at-grade crossings. The reason no major change in the overall rankings of the various at-grade crossings occurs is that the net increases in train traffic resulting from the project, while different for the various rail segments analyzed, tend to be proportional to the baseline train traffic on each segment.

Segment 1, where the greatest increase in train traffic occurs, is also the most heavily traveled segment initially. The proportional effect of nine trains on the hazards along this segment are therefore very similar to the proportional effect of one or two trains on less heavily traveled rail segments in Orange or Los Angeles counties.

Summary of Rail Related Impacts

The project related usage of rail transport is expected to have a minimal impact on the rail lines and surrounding infrastructure. When operating at maximum daily capacity, the project will receive an average of four to five shipments of refuse per day, generating double this number of trains, as each shipment will require both the delivery of full containers and the return of empty containers. All 9.4 trains per day will utilize the primary analysis segment (Segment 1), with lesser increases in train traffic along each of the other segments included in the analysis.

The impact of the project on delays to vehicles using at-grade crossings is minimal. Average vehicle delays of one to two minutes can be expected for each train in Riverside County, and fewer than ten vehicles would be affected at any one crossing in Riverside County other than Monroe Street in Indio, where 15 vehicles would be delayed by the passage of a single refuse train.

A total of less than 80 hours of delay to vehicles encountering refuse unit trains when using at-grade crossings is expected on an average daily basis. Most of this delay would occur along Segment 5, servicing northern Orange County, where a combination of high traffic volumes and low train speeds result in much higher delays than along other rail segments.

The project is not expected to have a significant impact on safety within the study area. The forecast increase in background highway traffic volumes between 1989 and 1995 has a much greater effect on the calculated hazard indices for the at-grade crossings analyzed than the project related increase in train traffic. The project will not significantly affect the ranking of crossings along the primary analysis segment when compared to other crossings included in the safety analysis, nor will any Riverside County crossing reach the top seven percent threshold defined as indicating a deficient condition. Therefore, there is no significant rail safety impact associated with this project.

**PROJECT DESCRIPTION AND IMPACTS -
HIGHWAY SYSTEM RELATED CHARACTERISTICS**

The proposed landfill will impact the highway system in two primary ways. Approximately 25% of the waste delivered to the site will be transported via truck, and the project will also generate new employment at Eagle Mountain, both of which will impact the highway system in the vicinity of the project. Each of these effects will be examined in detail.

The project is expected to accept 4,000 tons of refuse delivered via truck transport on a daily basis. It is anticipated that half of this waste will come from within Riverside County and the other half will be transported to the landfill via truck from San Bernardino County. The typical trucks arriving at the site are expected to be carrying containers identical to the containers arriving by train. A small amount of trash from local areas may arrive via conventional transfer trailers.

A total of approximately 200 truck shipments per day would be required to deliver refuse to the landfill in intermodal transfer containers. The trucks could arrive at any time of day, as the marshalling yard will be operational 24 hours a day. This would result in an average of just over eight shipments arriving each hour. A more conservative scenario would be the arrival of truck shipments during daylight hours only (12 to 13 hours daily). An average of 16 shipments arriving each hour results from this more conservative assumption. This more conservative estimate will be utilized in the intersection operations analysis.

All trucks would be required to use Kaiser Truck Road via Eagle Mountain Road under normal circumstances for shipment delivery. Almost all of the waste is expected to come from the more urbanized western regions of Riverside and San Bernardino counties, where most of the refuse from these counties is generated. The intersection operational analysis that is presented in this section is based on the assumption that only one shipment during the peak hour will arrive from east of the site.

The landfill is also expected to employ 150 people at the site itself. Specific trip generation data is not available for a facility with the unique characteristics of the proposed Eagle Mountain landfill. The trip generation characteristics of many land use types have been studied, however, and a review of the Institute of Transportation Engineers' (ITE) *Trip Generation Manual, Fourth Edition* (Institute of Transportation Engineers, 1987) suggests that the land use category General Light Industry (ITE land use code 110) is most applicable in this instance.

The daily traffic volume related to traffic other than the trucks delivering refuse to the site is slightly less than 500 total daily trips, or 250 inbound and 250 outbound trips. Based on relative population densities, it is estimated that 85% of the trips will be to and from the west, while 10% have origins or destinations to the east, and 5% travel to and from the north on Desert Center Rice Road. These trips would include both employee travel to and from work, and trips made by delivery vehicles, service vehicles, and other traffic to and from the site.

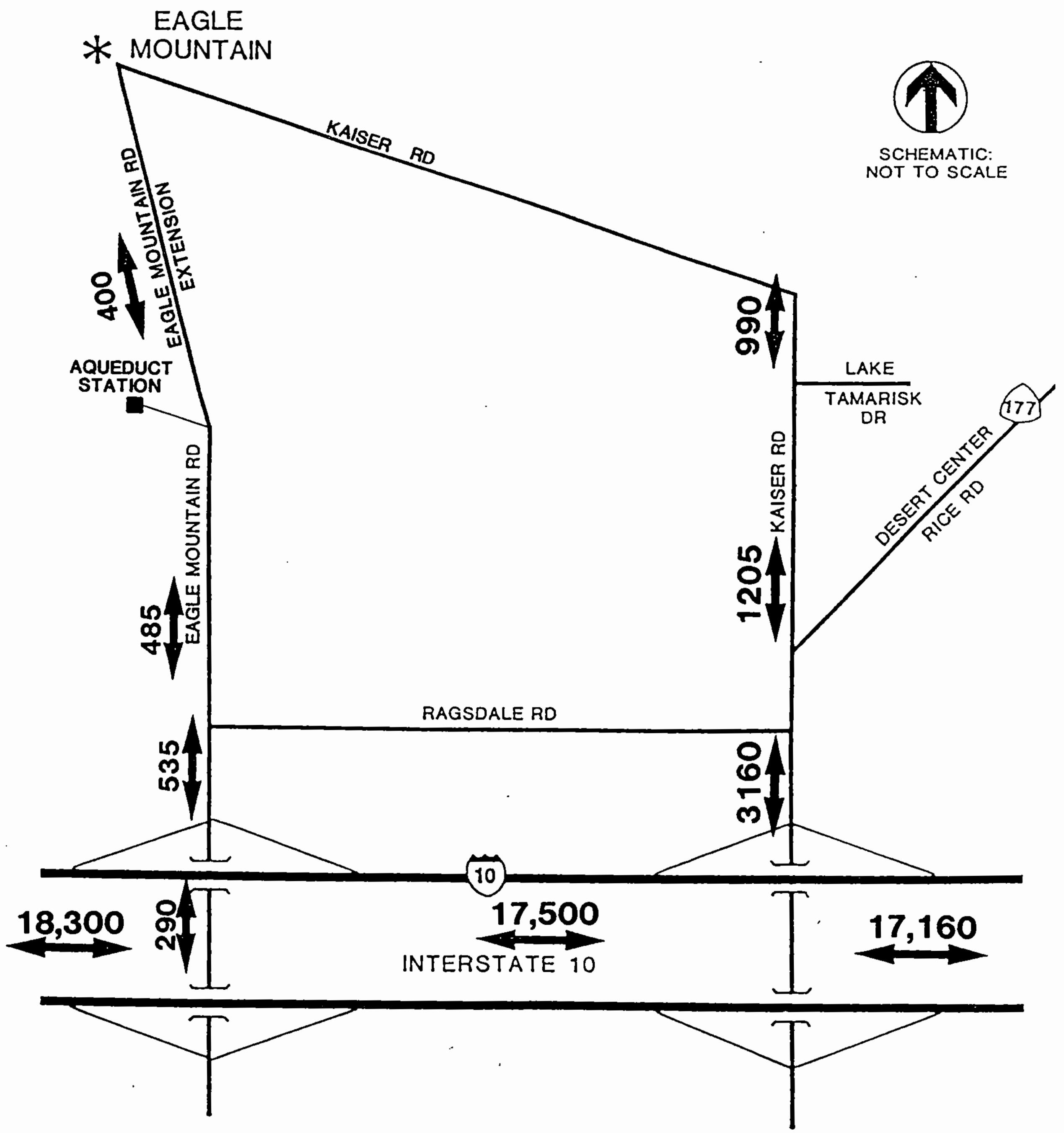
Although long-term relocation of employees would likely result in some trips terminating within the study area, all traffic was conservatively assumed to exit the study area. For instance, the residential area located near the landfill is going to be refurbished, and the relocation of employees to this area could significantly reduce the peak hour traffic associated with the landfill. All traffic other than trucks carrying refuse will be required to access the site via Kaiser Road and the Desert Center Rice Road/I-10 interchange. This policy will require enforcement in the form of a manual access gate at the entrance to the Kaiser Truck Road or some other form of positive control.

The assumptions outlined above form the basis for distribution of project related traffic to the roadway network for both daily and peak hour conditions. Figure 8 presents the expected 1995 build condition daily traffic volumes on study area roadways.

Project Impacts on Roadway Segment Operating Conditions

The roadway segment operations analysis has been repeated for future 1995 conditions with the project. The highest hour of site specific traffic generation was used to estimate project peak hour impacts, as the peak hour of project traffic generation is likely to control the overall peak hour on roadways within the study area. The site generated traffic was then added to the peak hour traffic volumes at each analysis location under no-build conditions, yielding the most conservative possible peak hour traffic volumes under project build conditions. The results of the operations analysis are summarized in Table 10, and indicate that acceptable roadway operations will continue to occur on all segments analyzed. Therefore, the project has no significant impact on roadway segment operations.

DKS Associates



NOTE: Traffic volumes include both trucks and other vehicles.

Figure 8
FORECAST 1995 DAILY TRAFFIC WITH PROJECT

Table 10
1995 Conditions with Project
Roadway Segment LOS Analysis Summary

Segment	Peak Hour Volume	LOS
Eagle Mountain Rd. n/o Ragsdale Rd.	44	A
Eagle Mountain Rd. n/o Aqueduct Station	29	A
Kaiser Rd. n/o Desert Center Rice Rd.	179	A
Kaiser Rd. n/o Lake Tamarisk Dr.	176	A

Project Impacts on Intersection Operating Conditions

The highest hour of site specific traffic generation was used to estimate project peak hour impacts, as the peak hour of project traffic generation is likely to control the overall peak hour at intersections within the study area. The site generated traffic was then added to the peak hour traffic volumes at each analysis location under no-build conditions, yielding the most conservative possible peak hour traffic volumes under project build conditions.

During the peak hour, a total of 116 trips is expected to enter and exit the site in addition to the previously described truck trips related to the delivery of refuse. A total of 81 trips would leave the site, while 35 vehicles would be entering the site. The same directional distribution of trips described for daily traffic was used to distribute the peak hour traffic.

Operations analyses were again conducted for each study area intersection, and no significant degradation in operations is anticipated as a result of the project related traffic. All traffic movements analyzed would continue to operate at Level of Service (LOS) A, with minimal delays and no lack of capacity.

Sufficient excess roadway capacity exists to serve all increases in traffic volumes in the foreseeable future. Background growth in traffic unrelated to specific developments would likely occur at a rate of one to two percent per year or less and such growth could be accommodated for decades. Additional increases in traffic of two percent per year for 40 years would result in a doubling of traffic volumes, which could easily be accommodated by the existing roadway infrastructure.

Specific developments generating additional traffic would be required to study the impacts of their own traffic and mitigate any deficiencies identified.

Summary of Highway Related Impacts

The project is expected to generate a total of approximately 900 new trips either to or from the proposed landfill on a daily basis. This total number of trips includes 800 new truck trips each day, with 200 inbound trucks delivering refuse and 200 outbound trucks carrying away empty containers, and nearly 500 other new trips.

During the peak hour of daily traffic to and from the site, an estimated total of just under 150 trips would be generated. This would include 16 refuse trucks both entering and exiting the site during the course of the hour, and 116 other trips comprised of arriving and departing employees, delivery and service traffic, and any other project related traffic. The majority of this traffic is expected to travel to and from the west.

Operations analyses at study area intersections indicate that excellent operating conditions will continue to exist in the study area. All study area traffic movements will continue to experience LOS A conditions.

IMPACTS RELATED TO REALIGNMENT OF THE EAGLE MOUNTAIN RAILROAD AND KAISER TRUCK ROAD

The current terminus of the Eagle Mountain Railroad is located at the western end of the proposed landfill, while the expected long-term location of the marshalling yard for the landfill will be at the eastern end of the project. Current alternatives being examined include immediate relocation of the Eagle Mountain Railroad terminus to the eastern end of the project, or construction of a temporary marshalling yard that will be utilized until the western end of the landfill's capacity is exhausted. Assuming the landfill is accepting 20,000 tons of refuse daily by 1995, this would occur in approximately 25 years, or in the year 2020. Landfill activities would then move to the eastern side of the project. This proposed realignment would create roadway and rail crossings of Kaiser Road, which serves the community of Eagle Mountain, including the local high school (Eagle Mountain Junior and Senior High School).

If the railroad were relocated immediately, the projected build condition traffic volumes on Kaiser Road and train traffic can be used to calculate the hazard index at this location. Table 11 presents the projected hazard indices at this location for a range of at-grade crossing protection devices.

Table 11
Hazard Index at Proposed Kaiser Road At-Grade Crossings

Type of Protection	Hazard Index
Crossbucks	5,358
Wigwag	1,821
Flashing Lights	1,072
Automatic Gate	589

Even with minimal protection present, in the form of warning signs only, the hazard index at this location is very low. Compared to the other 95 locations examined, this crossing would rank 66th (with 1st being most hazardous and 95th safest). The presence of school children nearby makes the installation of automatic gates at this proposed at-grade crossing highly desirable. Provision of automatic gates at this location would make this one of the lowest hazard at-grade crossings in the study area (ranked 95th of 96 locations).

Realignment of the Kaiser Truck Road will create a new intersection at Kaiser Road. This intersection will carry relatively few vehicles, and could be configured in several different ways. The optimal configuration would be construction as a two-way stop, with the stop signs placed on the lower volume legs of the intersection, Kaiser Road. The traffic volumes on all approaches to this intersection are low enough that the stop signs could instead be placed on the Kaiser Truck Road, or the intersection could even be configured as a four-way stop, with stop signs on all four approaches to the intersection. Regardless of the configuration, LOS A operating conditions would result. Installation of a traffic signal would not be warranted per guidelines developed by the California Department of Transportation (Caltrans) and is therefore not recommended.

6. Project Alternatives

6. Project Alternatives

Two alternatives to the project have been identified and analyzed in this study. The first alternative eliminates all deliveries of refuse to the site by truck, without affecting shipments via rail at all. The second alternative would reduce the quantity of material received daily by reducing shipments by both rail and truck.

RAIL ACCESS ONLY ALTERNATIVE

The primary project alternative identified eliminates altogether the transport of refuse to the landfill via truck. All deliveries to the site would be made by rail, and the overall quantity of waste handled at the site on a daily basis would be reduced by 20% to 16,000 tons daily.

The proposed project alternative would primarily affect the impacts of the project on the highway network. There would be no change in the average number of daily unit trains delivering refuse to the site, and service would be provided along the same routes described previously in the project description section of this report.

The proposed elimination of refuse deliveries to the site by truck would not change the amount of highway traffic using at-grade crossings along the rail routes, nor would it affect the average number of trains using these crossings. The amount of delay caused by the project at these crossings is unchanged from the delays caused by the proposed project itself. As previously described, average delays of one to two minutes per vehicle would be incurred at each grade crossing by the passage of a refuse train.

Similarly, the project alternative would result in the same hazard rankings for each of the at-grade crossings studied. The effect of the project alternative is again negligible in terms of increasing the ranking of crossings along the primary analysis segment between Colton and Eagle Mountain. The changes caused by increases in highway volumes at these crossings resulting from regional growth are greater than the changes caused by the project itself.

The proposed project alternative would significantly reduce the overall volume of traffic to the site and would also decrease the percentage of truck traffic generated by the landfill. Eliminating the 400 two-way truck trips delivering refuse to the site drops the overall number of trip ends generated by the landfill from 1,300 trip ends to 500 trip ends daily. Truck trips to the site would be made on an incidental basis only, for purposes such as supply deliveries. All of the benefit of this reduction in truck traffic would be evident along the Kaiser Truck Road and on Eagle Mountain Road between the Kaiser Road and the I-10 interchange, the proposed route for delivery of refuse to the site.

Traffic volumes on Kaiser Road and Desert Center Rice Road would remain unchanged from the conditions described for the primary project. Intersection operations at the locations analyzed would continue to be excellent, as the proposed project alternative would not cause any further increase in traffic beyond that projected for the project.

REDUCED OPERATIONS ALTERNATIVE

The second alternative to the proposed project will reduce the quantity of material shipped by rail from 16 tons daily to 14 tons daily and will also reduce the quantity of material shipped by truck from four tons daily to two tons daily.

The reduction in the quantity of material shipped by rail would result in an average of 4.1 trains per day delivering refuse to the site. The amount of daily delay would be reduced proportionately, while the per train delays would remain unchanged. Similarly, the calculated values of the hazard indices would be reduced by 13% along the primary segment, as the hazard index is directly proportional to the daily train volume. Similar but smaller effects of this alternative would occur along the secondary rail segments.

The reduction in truck traffic would again affect only I-10, Eagle Mountain Road, and the Eagle Mountain Road Extension. Two hundred two-way truck trips would be eliminated, and the overall number of trip ends generated by the project would drop from 1,300 to 900 trip ends per day.

Level of service A conditions would still prevail for all traffic movements analyzed in the study area.

APPENDIX A
At-Grade Crossing Existing Conditions

EAGLE MOUNTAIN

Existing Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1A.WK1

STREET NAME	LANES	TRAIN SPEED (mph)	1989 ADT	1989 ELAPSED TIME (min)	1989 TOTAL VEH. DELAYED (veh)	1989 TOTAL DELAY TIME (veh-hrs)	1989 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO- TEC- TION	RELATIVE HAZARD (Pf)	EXISTING HAZARD INDEX
SEGMENT 1: EAGLE MOUNTAIN TO COLTON/SAN BERN. TRNSFR. STN.											
Parkside Dr.	2	65	270	1.5	0.2	0.00	0.0	31	8	0.2	1,674
Bay Dr.	2	65	550	1.5	0.5	0.01	1.2	31	8	0.2	3,410
Cleveland St.	2	65	60	1.5	0.1	0.00	0.0	31	9	0.11	205
66th Ave.	2	65	3,130	1.6	2.9	0.03	0.6	31	9	0.11	10,673
62nd Ave.	2	65	490	1.5	0.4	0.00	0.0	31	9	0.11	1,671
58th Ave.	2	65	630	1.5	0.6	0.01	1.0	31	8	0.2	3,906
Airport Blvd.	2	65	4,590	1.6	4.3	0.04	0.6	31	9	0.11	15,652
52nd Ave.	2	65	990	1.5	0.9	0.01	0.7	30	9	0.11	3,267
5th St.	2	65	205	1.5	0.2	0.00	0.0	28	8	0.2	1,148
50th Ave.	2	65	1,137	1.5	1.0	0.01	0.6	28	8	0.2	6,367
Dillon Rd.	2	65	5,800	1.6	5.5	0.05	0.5	31	9	0.11	19,778
Monroe St.	2	30	7,422	2.6	11.8	0.17	0.9	28	9	0.11	22,860
Tipton	2	40	90	1.9	0.1	0.00	0.0	36	8	0.2	648
Broadway	2	40	1,490	2.0	1.8	0.03	1.0	36	9	0.11	5,900
Apache Trail	2	40	3,020	2.0	3.7	0.05	0.8	6	9	0.11	1,993
Hargrave	2	40	3,010	2.0	3.7	0.05	0.8	35	9	0.11	11,589
San Gorgonio	2	40	2,950	2.0	3.6	0.05	0.8	34	9	0.11	11,033
22nd St.	2	40	5,669	2.1	7.2	0.09	0.8	35	9	0.11	21,826
North Sunset	2	40	530	1.9	0.6	0.01	1.0	35	9	0.11	2,041
Highland Springs	2	40	230	1.9	0.3	0.00	0.0	36	9	0.11	911
Pennsylvania	2	50	500	1.7	0.5	0.01	1.2	35	9	0.11	1,925
Beaumont St.	2	50	3,400	1.8	3.6	0.04	0.7	35	9	0.11	13,090
California	2	50	1,150	1.7	1.2	0.01	0.5	35	9	0.11	4,428
Veile Ave.	2	50	400	1.7	0.4	0.01	1.5	35	8	0.2	2,800
San Timoteo Canyon Rd.	2	50	360	1.7	0.4	0.00	0.0	36	9	0.11	1,426

EAGLE MOUNTAIN

Existing Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1A.WK1

SAFETY ANALYSIS

STREET NAME	LANES	TRAIN SPEED (mph)	1989 ADT	1989 ELAPSED TIME (min)	1989 TOTAL VEH. DELAYED (veh)	1989 TOTAL DELAY TIME (veh-hrs)	1989 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	EXISTING HAZARD INDEX
Live Oak Canyon	2	40	770	2.0	0.9	0.01	0.7	6	9	0.11	508
Alessandro Rd.	2	40	3,290	2.0	4.0	0.05	0.8	50	9	0.11	18,095
San Timoteo Canyon Rd.	2	40	5,146	2.1	6.5	0.08	0.7	50	9	0.11	28,303
Beaumont Ave.	2	40	826	2.0	1.0	0.01	0.6	50	9	0.11	4,543
Whittier Ave.	2	40	150	1.9	0.2	0.00	0.0	50	9	0.11	825
Hunts Ln.	2	50	10,158	1.9	12.0	0.11	0.6	50	9	0.11	55,869
						0.94					
SEGMENT 2: KAISER SPUR TO INDUSTRY TRANSFER STATION											
Milliken Ave.	6	65	20,000	1.6	19.3	0.18	0.6	35	9	0.11	77,000
Vineyard Ave.	4	60	18,974	1.8	20.0	0.18	0.5	35	9	0.11	73,050
						0.36					
SEGMENT 3: INDUSTRY TRANS. STN. TO INDUSTRY BRANCH POINT											
Nogales St.	5	60	28,343	1.8	30.7	0.25	0.5	28	9	0.11	87,296
Sunset Ave.	5	60	16,026	1.7	16.1	0.16	0.6	28	9	0.11	49,360
						0.41					
SEGMENT 4: INDUSTRY BRANCH POINT TO S. PACIFIC'S L.A. YARD											
Ramona	4	30	31,000	2.9	56.3	0.64	0.7	28	9	0.11	95,480
Valley	4	25	19,508	3.0	36.9	0.58	0.9	28	9	0.11	60,085
						1.22					

EAGLE MOUNTAIN

Existing Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1A.WK1

STREET NAME	LANES	TRAIN SPEED (mph)	1989 ADT	1989 ELAPSED TIME (min)	1989 TOTAL VEH. DELAYED (veh)	1989 TOTAL DELAY TIME (veh-hrs)	1989 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	EXISTING HAZARD INDEX
SEGMENT 5: SOUTHERN PACIFIC'S L.A. YARD to N. ORANGE COUNTY											
Washington Blvd.	4	10	24,150	6.4	100.9	3.11	1.8	NA	NA	NA	ERR
Santa Fe Ave.	4	10	15,300	6.0	59.7	2.11	2.1	NA	NA	NA	ERR
25th Street	4	10	4,500	5.6	16.3	0.67	2.5	NA	NA	NA	ERR
E. Alameda St.	2	10	8,000	6.0	31.2	1.09	2.1	NA	NA	NA	ERR
41st Street	2	10	9,920	6.2	39.8	1.31	2.0	24	4	0.34	80,947
Vernon Ave.	5	10	12,100	5.8	45.5	1.75	2.3	4	4	0.34	16,456
55th St.	2	10	6,190	5.9	23.5	0.86	2.2	28	4	0.34	58,929
Slauson Ave.	4	10	28,300	6.7	122.3	3.53	1.7	28	8	0.2	158,480
Gage Ave.	3	20	17,100	3.6	39.3	0.69	1.1	28	8	0.2	95,760
Florence Ave.	6	20	26,310	3.5	58.6	1.12	1.1	28	8	0.2	147,336
Nadeau St.	5	20	12,500	3.3	26.2	0.56	1.3	28	9	0.11	38,500
Santa Fe Ave.	4	15	8,900	4.1	23.4	0.64	1.6	20	9	0.11	19,580
Long Beach Blvd.	4	15	18,300	4.4	51.6	1.23	1.4	20	9	0.11	40,260
State St.	4	20	12,000	3.4	25.5	0.53	1.2	10	9	0.11	13,200
Otis Ave.	4	20	12,000	3.4	25.5	0.53	1.2	30	9	0.11	39,600
Atlantic Ave.	6	20	25,000	3.5	55.3	1.07	1.2	10	9	0.11	27,500
Garfield Ave.	6	20	24,100	3.5	53.1	1.04	1.2	10	9	0.11	26,510
Firestone Blvd.	8	20	43,100	3.6	99.3	1.80	1.1	6	9	0.11	28,446
Paramount Blvd.	6	20	24,700	3.5	54.6	1.06	1.2	10	9	0.11	27,170
Lakewood Blvd.	6	20	34,000	3.7	78.8	1.40	1.1	10	9	0.11	37,400
Woodruff Ave.	4	20	14,000	3.4	30.1	0.61	1.2	4	9	0.11	6,160
Studebaker Rd.	4	20	12,220	3.4	26.0	0.54	1.2	6	8	0.2	14,664
Pioneer Blvd.	4	20	14,950	3.4	32.4	0.64	1.2	6	9	0.11	9,867
San Antonio Blvd.	4	20	17,600	3.5	38.9	0.74	1.1	2	9	0.11	3,872

EAGLE MOUNTAIN

Existing Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1A.WK1

STREET NAME	LANES	TRAIN SPEED (mph)	1989 ADT	1989 ELAPSED TIME (min)	1989 TOTAL VEH. DELAYED (veh)	1989 TOTAL DELAY TIME (veh-hrs)	1989 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	EXISTING HAZARD INDEX
Rosecrans Ave.	6	20	28,000	3.5	62.9	1.19	1.1	6	9	0.11	18,480
Artesia Blvd.	6	20	25,000	3.5	55.3	1.07	1.2	12	9	0.11	33,000
Knott Ave.	4	20	20,000	3.6	45.1	0.83	1.1	12	9	0.11	26,400
Western Ave.	4	20	15,000	3.4	32.6	0.64	1.2	12	9	0.11	19,800
Beach Blvd.	6	20	34,000	3.7	78.8	1.40	1.1	30	9	0.11	112,200
Stanton Ave.	4	20	11,600	3.4	24.5	0.51	1.2	30	9	0.11	38,280
						34.27					
SEGMENT 6: COLTON YARD to LA VERNE TRANSFER STATION											
Pepper Ave.	2	10	10,000	6.2	40.3	1.32	2.0	2	8	0.2	4,000
Sycamore Ave.	2	10	3,500	5.7	12.8	0.51	2.4	2	3	0.34	2,380
Riverside Ave.	4	10	12,000	5.9	45.7	1.70	2.2	2	9	0.11	2,640
Alder Ave.	2	10	4,100	5.7	15.1	0.59	2.3	2	9	0.11	902
Mango Ave.	2	10	6,000	5.9	22.7	0.84	2.2	2	8	0.2	2,400
Sierra Ave.	4	10	12,300	5.9	47.0	1.74	2.2	2	8	0.2	4,920
Juniper Ave.	2	10	5,200	5.8	19.5	0.74	2.3	2	9	0.11	1,144
Milliken Ave.	2	10	5,000	5.8	18.7	0.71	2.3	2	9	0.11	1,100
Haven Ave.	2	10	7,400	6.0	28.6	1.01	2.1	2	9	0.11	1,628
Archibald Ave.	4	10	3,400	5.6	12.2	0.51	2.5	2	9	0.11	748
Base Line St.	4	10	8,000	5.7	29.6	1.16	2.4	2	9	0.11	1,760
Grove Ave.	4	10	8,800	5.8	32.8	1.27	2.3	2	9	0.11	1,936
Campus Ave.	4	10	4,800	5.6	17.4	0.71	2.4	2	3	0.34	3,264
Euclid Ave.	6	10	24,600	6.1	97.4	3.41	2.1	2	9	0.11	5,412
San Antonio Ave.	4	10	7,400	5.7	27.3	1.08	2.4	2	3	0.34	5,032
Mountain Ave.	4	10	13,400	6.0	51.6	1.88	2.2	2	9	0.11	2,948

EAGLE MOUNTAIN

Existing Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1A.WK1

STREET NAME	LANES	TRAIN SPEED (mph)	1989 ADT	1989 ELAPSED TIME (min)	1989 TOTAL VEH. DELAYED (veh)	1989 TOTAL DELAY TIME (veh-hrs)	1989 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO- TEC- TION	RELATIVE HAZARD (Pf)	EXISTING HAZARD INDEX
Benson Ave.	2	10	3,500	5.7	12.8	0.51	2.4	2	1	1	7,000
Central Ave.	4	10	14,000	6.0	54.1	1.95	2.2	2	9	0.11	3,080
Towne Ave.	2	10	7,961	6.0	31.1	1.08	2.1	2	9	0.11	1,751
Garey Ave.	4	10	11,700	5.9	44.5	1.66	2.2	4	9	0.11	5,148
Pine St.	2	10	7,961	6.0	31.1	1.08	2.1	28	1	1	222,908
Fulton Rd.	2	10	11,700	6.4	48.3	1.50	1.9	8	9	0.11	10,296
White Ave.	4	10	9,103	5.8	34.0	1.31	2.3	8	9	0.11	8,011
D Street	2	10	5,000	5.8	18.7	0.71	2.3	4	1	1	20,000
						28.98					
SEGMENT 7: LA VERNE TRANS. STN. to IRWINDALE TRANS. STN.											
Sunflower Ave.	2	10	4,320	5.7	16.0	0.62	2.3	4	9	0.11	1,901
Covina Blvd.	2	10	3,500	5.7	12.8	0.51	2.4	4	9	0.11	1,540
Barranca Ave.	2	10	9,000	6.1	35.7	1.20	2.0	4	8	0.2	7,200
Hollenbeck Ave.	2	10	7,500	6.0	29.1	1.03	2.1	4	8	0.2	6,000
Azusa Ave.	6	10	12,900	5.8	48.3	1.89	2.3	4	9	0.11	5,676
Irwindale Ave.	2	10	6,217	5.9	23.6	0.87	2.2	4	8	0.2	4,974
						6.12					
SEGMENT 8: IRWINDALE TRANS. STN. to INDUSTRY BRANCHPOINT											
Ramona Blvd./Downing Av.	4	20	15,000	3.4	32.6	0.64	1.2	4	9	0.11	6,600
Francisquito Ave.	4	20	15,000	3.4	32.6	0.64	1.2	4	9	0.11	6,600
						1.28					

APPENDIX B
Traffic Count Data

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. BETWEEN I-10 RAMPS
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:59	0	1	1
1:00 - 1:59	0	2	2
2:00 - 2:59	0	5	5
3:00 - 3:59	0	2	2
4:00 - 4:59	2	0	2
5:00 - 5:59	0	0	0
6:00 - 6:59	0	0	0
7:00 - 7:59	0	1	1
8:00 - 8:59	0	3	3
9:00 - 9:59	0	2	2
10:00 - 10:59	0	6	6
11:00 - 11:59	1	3	4
12:00 - 12:59	0	1	1
13:00 - 13:59	1	0	1
14:00 - 14:59	0	4	4
15:00 - 15:59	2	4	6
16:00 - 16:59	0	3	3
17:00 - 17:59	0	2	2
18:00 - 18:59	0	7	7
19:00 - 19:59	0	1	1
20:00 - 20:59	1	2	3
21:00 - 21:59	0	0	0
22:00 - 22:59	0	2	2
23:00 - 23:59	0	5	5
ADT :	7	56	63
Factored ADT :	7	56	63
AM Peak Time :	4:00- 5:00	10:15-11:15	10:15-11:15
AM Peak Volume:	2	8	9
PM Peak Time :	14:30-15:30	18:00-19:00	14:30-15:30
PM Peak Volume:	2	7	8

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. BETWEEN I-10 RAMPS
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:14	0	0	0
12:15 - 12:29	0	1	1
12:30 - 12:44	0	0	0
12:45 - 12:59	0	0	0
Hour Total	0	1	1
1:00 - 1:14	0	0	0
1:15 - 1:29	0	2	2
1:30 - 1:44	0	0	0
1:45 - 1:59	0	0	0
Hour Total	0	2	2
2:00 - 2:14	0	5	5
2:15 - 2:29	0	0	0
2:30 - 2:44	0	0	0
2:45 - 2:59	0	0	0
Hour Total	0	5	5
3:00 - 3:14	0	2	2
3:15 - 3:29	0	0	0
3:30 - 3:44	0	0	0
3:45 - 3:59	0	0	0
Hour Total	0	2	2
4:00 - 4:14	0	0	0
4:15 - 4:29	0	0	0
4:30 - 4:44	0	0	0
4:45 - 4:59	2	0	2
Hour Total	2	0	2
5:00 - 5:14	0	0	0
5:15 - 5:29	0	0	0
5:30 - 5:44	0	0	0
5:45 - 5:59	0	0	0
Hour Total	0	0	0
6:00 - 6:14	0	0	0
6:15 - 6:29	0	0	0
6:30 - 6:44	0	0	0
6:45 - 6:59	0	0	0
Hour Total	0	0	0
7:00 - 7:14	0	0	0
7:15 - 7:29	0	0	0
7:30 - 7:44	0	1	1
7:45 - 7:59	0	0	0
Hour Total	0	1	1

Location: EAGLE MOUNTAIN RD. BETWEEN I-10 RAMPS
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
8:00 - 8:14	0	2	2
8:15 - 8:29	0	0	0
8:30 - 8:44	0	0	0
8:45 - 8:59	0	1	1
Hour Total	0	3	3
9:00 - 9:14	0	0	0
9:15 - 9:29	0	2	2
9:30 - 9:44	0	0	0
9:45 - 9:59	0	0	0
Hour Total	0	2	2
10:00 - 10:14	0	0	0
10:15 - 10:29	~~0~~	~~1~~	1
10:30 - 10:44	~~0~~	~~0~~	0
10:45 - 10:59	~~0~~	~~5~~	5
Hour Total	0	6	6
11:00 - 11:14	~~1~~	~~2~~	3
11:15 - 11:29	0	0	0
11:30 - 11:44	0	0	0
11:45 - 11:59	0	1	1
Hour Total	1	3	4
12:00 - 12:14	0	0	0
12:15 - 12:29	0	0	0
12:30 - 12:44	0	1	1
12:45 - 12:59	0	0	0
Hour Total	0	1	1
13:00 - 13:14	0	0	0
13:15 - 13:29	0	0	0
13:30 - 13:44	0	0	0
13:45 - 13:59	1	0	1
Hour Total	1	0	1
14:00 - 14:14	0	0	0
14:15 - 14:29	0	1	1
14:30 - 14:44	0	2	2
14:45 - 14:59	0	1	1
Hour Total	0	4	4
15:00 - 15:14	0	2	2
15:15 - 15:29	2	1	3
15:30 - 15:44	0	0	0
15:45 - 15:59	0	1	1
Hour Total	2	4	6
16:00 - 16:14	0	0	0
16:15 - 16:29	0	2	2
16:30 - 16:44	0	1	1
16:45 - 16:59	0	0	0
Hour Total	0	3	3

Location: EAGLE MOUNTAIN RD. BETWEEN I-10 RAMPS
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
17:00 - 17:14	0	2	2
17:15 - 17:29	0	0	0
17:30 - 17:44	0	0	0
17:45 - 17:59	0	0	0
Hour Total	0	2	2
18:00 - 18:14	0	2	2
18:15 - 18:29	0	0	0
18:30 - 18:44	0	3	3
18:45 - 18:59	0	2	2
Hour Total	0	7	7
19:00 - 19:14	0	0	0
19:15 - 19:29	0	0	0
19:30 - 19:44	0	0	0
19:45 - 19:59	0	1	1
Hour Total	0	1	1
20:00 - 20:14	1	2	3
20:15 - 20:29	0	0	0
20:30 - 20:44	0	0	0
20:45 - 20:59	0	0	0
Hour Total	1	2	3
21:00 - 21:14	0	0	0
21:15 - 21:29	0	0	0
21:30 - 21:44	0	0	0
21:45 - 21:59	0	0	0
Hour Total	0	0	0
22:00 - 22:14	0	1	1
22:15 - 22:29	0	0	0
22:30 - 22:44	0	0	0
23:45 - 22:59	0	1	1
Hour Total	0	2	2
23:00 - 23:14	0	2	2
23:15 - 23:29	0	0	0
23:30 - 23:44	0	2	2
23:45 - 23:59	0	1	1
Hour Total	0	5	5
ADT :	7	56	63
Factored ADT :	7	56	63
AM Peak Time :	4:00- 5:00	10:15-11:15	10:15-11:15
AM Peak Volume:	2	8	9
PM Peak Time :	14:30-15:30	18:00-19:00	14:30-15:30
PM Peak Volume:	2	7	8

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. BETWEEN RAGSDALE RD.& I-10 W/B
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
Mid - 12:59	1	0	1
1:00 - 1:59	0	5	5
2:00 - 2:59	0	7	7
3:00 - 3:59	0	5	5
4:00 - 4:59	0	0	0
5:00 - 5:59	0	1	1
6:00 - 6:59	3	9	12
7:00 - 7:59	3	1	4
8:00 - 8:59	4	3	7
9:00 - 9:59	2	2	4
10:00 - 10:59	6	1	7
11:00 - 11:59	3	1	4
12:00 - 12:59	3	3	6
13:00 - 13:59	0	1	1
14:00 - 14:59	5	1	6
15:00 - 15:59	3	2	5
16:00 - 16:59	3	4	7
17:00 - 17:59	4	2	6
18:00 - 18:59	7	0	7
19:00 - 19:59	1	0	1
20:00 - 20:59	1	0	1
21:00 - 21:59	0	0	0
22:00 - 22:59	2	1	3
23:00 - 23:59	5	5	10
ADT :	56	54	110
Factored ADT :	56	54	110
AM Peak Time :	10:15-11:15	1:15- 2:15	5:45- 6:45
AM Peak Volume:	7	12	13
PM Peak Time :	14:15-15:15	22:15-23:15	22:45-23:45
PM Peak Volume:	7	6	11

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. BETWEEN RAGSDALE RD.& I-10 W/B
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
Mid - 12:14	0	0	0
12:15 - 12:29	1	0	1
12:30 - 12:44	0	0	0
12:45 - 12:59	0	0	0
Hour Total	1	0	1
1:00 - 1:14	0	0	0
1:15 - 1:29	0	3	3
1:30 - 1:44	0	0	0
1:45 - 1:59	0	2	2
Hour Total	0	5	5
2:00 - 2:14	0	7	7
2:15 - 2:29	0	0	0
2:30 - 2:44	0	0	0
2:45 - 2:59	0	0	0
Hour Total	0	7	7
3:00 - 3:14	0	4	4
3:15 - 3:29	0	0	0
3:30 - 3:44	0	1	1
3:45 - 3:59	0	0	0
Hour Total	0	5	5
4:00 - 4:14	0	0	0
4:15 - 4:29	0	0	0
4:30 - 4:44	0	0	0
4:45 - 4:59	0	0	0
Hour Total	0	0	0
5:00 - 5:14	0	0	0
5:15 - 5:29	0	0	0
5:30 - 5:44	0	0	0
5:45 - 5:59	0	1	1
Hour Total	0	1	1
6:00 - 6:14	2	0	2
6:15 - 6:29	1	7	8
6:30 - 6:44	0	2	2
6:45 - 6:59	0	0	0
Hour Total	3	9	12
7:00 - 7:14	0	0	0
7:15 - 7:29	2	0	2
7:30 - 7:44	1	1	2
7:45 - 7:59	0	0	0
Hour Total	3	1	4

Location: EAGLE MOUNTAIN RD. BETWEEN RAGSDALE RD.& I-10 W/B
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
8:00 - 8:14	2	0	2
8:15 - 8:29	1	0	1
8:30 - 8:44	0	2	2
8:45 - 8:59	1	1	2
Hour Total	4	3	7
9:00 - 9:14	0	1	1
9:15 - 9:29	2	1	3
9:30 - 9:44	0	0	0
9:45 - 9:59	0	0	0
Hour Total	2	2	4
10:00 - 10:14	0	1	1
10:15 - 10:29	0	0	0
10:30 - 10:44	1	0	1
10:45 - 10:59	5	0	5
Hour Total	6	1	7
11:00 - 11:14	1	0	1
11:15 - 11:29	0	1	1
11:30 - 11:44	0	0	0
11:45 - 11:59	2	0	2
Hour Total	3	1	4
12:00 - 12:14	0	1	1
12:15 - 12:29	1	0	1
12:30 - 12:44	2	1	3
12:45 - 12:59	0	1	1
Hour Total	3	3	6
13:00 - 13:14	0	0	0
13:15 - 13:29	0	0	0
13:30 - 13:44	0	1	1
13:45 - 13:59	0	0	0
Hour Total	0	1	1
14:00 - 14:14	0	0	0
14:15 - 14:29	1	0	1
14:30 - 14:44	2	1	3
14:45 - 14:59	2	0	2
Hour Total	5	1	6
15:00 - 15:14	2	0	2
15:15 - 15:29	1	2	3
15:30 - 15:44	0	0	0
15:45 - 15:59	0	0	0
Hour Total	3	2	5
16:00 - 16:14	1	1	2
16:15 - 16:29	1	1	2
16:30 - 16:44	1	1	2
16:45 - 16:59	0	1	1
Hour Total	3	4	7

Location: EAGLE MOUNTAIN RD. BETWEEN RAGSDALE RD.& I-10 W/B
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
17:00 - 17:14	2	2	4
17:15 - 17:29	0	0	0
17:30 - 17:44	2	0	2
17:45 - 17:59	0	0	0
Hour Total	4	2	6
18:00 - 18:14	2	0	2
18:15 - 18:29	0	0	0
18:30 - 18:44	3	0	3
18:45 - 18:59	2	0	2
Hour Total	7	0	7
19:00 - 19:14	0	0	0
19:15 - 19:29	0	0	0
19:30 - 19:44	0	0	0
19:45 - 19:59	1	0	1
Hour Total	1	0	1
20:00 - 20:14	1	0	1
20:15 - 20:29	0	0	0
20:30 - 20:44	0	0	0
20:45 - 20:59	0	0	0
Hour Total	1	0	1
21:00 - 21:14	0	0	0
21:15 - 21:29	0	0	0
21:30 - 21:44	0	0	0
21:45 - 21:59	0	0	0
Hour Total	0	0	0
22:00 - 22:14	1	0	1
22:15 - 22:29	0	0	0
22:30 - 22:44	0	0	0
23:45 - 22:59	1	1	2
Hour Total	2	1	3
23:00 - 23:14	2	5	7
23:15 - 23:29	0	0	0
23:30 - 23:44	2	0	2
23:45 - 23:59	1	0	1
Hour Total	5	5	10

ADT :	56	54	110
Factored ADT :	56	54	110
AM Peak Time :	10:15-11:15	1:15- 2:15	5:45- 6:45
AM Peak Volume:	7	12	13
PM Peak Time :	14:15-15:15	22:15-23:15	22:45-23:45
PM Peak Volume:	7	6	11

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. N/O RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
Mid - 12:59	1	0	1
1:00 - 1:59	0	0	0
2:00 - 2:59	0	0	0
3:00 - 3:59	0	0	0
4:00 - 4:59	0	0	0
5:00 - 5:59	0	1	1
6:00 - 6:59	0	11	11
7:00 - 7:59	4	3	7
8:00 - 8:59	3	4	7
9:00 - 9:59	1	2	3
10:00 - 10:59	5	2	7
11:00 - 11:59	0	1	1
12:00 - 12:59	2	3	5
13:00 - 13:59	0	0	0
14:00 - 14:59	1	4	5
15:00 - 15:59	2	0	2
16:00 - 16:59	2	0	2
17:00 - 17:59	2	2	4
18:00 - 18:59	0	4	4
19:00 - 19:59	1	0	1
20:00 - 20:59	1	0	1
21:00 - 21:59	0	0	0
22:00 - 22:59	1	1	2
23:00 - 23:59	1	0	1
ADT :	27	38	65
Factored ADT :	27	38	65
AM Peak Time :	7:30- 8:30	5:45- 6:45	5:45- 6:45
AM Peak Volume:	6	12	12
PM Peak Time :	14:15-15:15	17:30-18:30	17:30-18:30
PM Peak Volume:	3	6	8

WEST COAST TRAFFIC COUNTERS

Location: EAGLE MOUNTAIN RD. N/O RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
Mid - 12:14	0	0	0
12:15 - 12:29	1	0	1
12:30 - 12:44	0	0	0
12:45 - 12:59	0	0	0
Hour Total	1	0	1
1:00 - 1:14	0	0	0
1:15 - 1:29	0	0	0
1:30 - 1:44	0	0	0
1:45 - 1:59	0	0	0
Hour Total	0	0	0
2:00 - 2:14	0	0	0
2:15 - 2:29	0	0	0
2:30 - 2:44	0	0	0
2:45 - 2:59	0	0	0
Hour Total	0	0	0
3:00 - 3:14	0	0	0
3:15 - 3:29	0	0	0
3:30 - 3:44	0	0	0
3:45 - 3:59	0	0	0
Hour Total	0	0	0
4:00 - 4:14	0	0	0
4:15 - 4:29	0	0	0
4:30 - 4:44	0	0	0
4:45 - 4:59	0	0	0
Hour Total	0	0	0
5:00 - 5:14	0	0	0
5:15 - 5:29	0	0	0
5:30 - 5:44	0	0	0
5:45 - 5:59	0	1	1
Hour Total	0	1	1
6:00 - 6:14	0	2	2
6:15 - 6:29	0	7	7
6:30 - 6:44	0	2	2
6:45 - 6:59	0	0	0
Hour Total	0	11	11
7:00 - 7:14	0	0	0
7:15 - 7:29	0	2	2
7:30 - 7:44	0	0	0
7:45 - 7:59	4	1	5
Hour Total	4	3	7

Location: EAGLE MOUNTAIN RD. N/O RAGSDALE RD.
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
8:00 - 8:14	1	1	2
8:15 - 8:29	1	0	1
8:30 - 8:44	0	2	2
8:45 - 8:59	1	1	2
Hour Total	3	4	7
9:00 - 9:14	0	0	0
9:15 - 9:29	1	1	2
9:30 - 9:44	0	1	1
9:45 - 9:59	0	0	0
Hour Total	1	2	3
10:00 - 10:14	0	1	1
10:15 - 10:29	0	0	0
10:30 - 10:44	0	1	1
10:45 - 10:59	5	0	5
Hour Total	5	2	7
11:00 - 11:14	0	0	0
11:15 - 11:29	0	0	0
11:30 - 11:44	0	0	0
11:45 - 11:59	0	1	1
Hour Total	0	1	1
12:00 - 12:14	0	1	1
12:15 - 12:29	0	1	1
12:30 - 12:44	2	1	3
12:45 - 12:59	0	0	0
Hour Total	2	3	5
13:00 - 13:14	0	0	0
13:15 - 13:29	0	0	0
13:30 - 13:44	0	0	0
13:45 - 13:59	0	0	0
Hour Total	0	0	0
14:00 - 14:14	0	0	0
14:15 - 14:29	1	3	4
14:30 - 14:44	0	0	0
14:45 - 14:59	0	1	1
Hour Total	1	4	5
15:00 - 15:14	2	0	2
15:15 - 15:29	0	0	0
15:30 - 15:44	0	0	0
15:45 - 15:59	0	0	0
Hour Total	2	0	2
16:00 - 16:14	0	0	0
16:15 - 16:29	1	0	1
16:30 - 16:44	1	0	1
16:45 - 16:59	0	0	0
Hour Total	2	0	2

Location: EAGLE MOUNTAIN RD. N/O RAGSDALE RD.
Count Date: Wednesday - November 29, 1989

Time	NorthBound Volume	SouthBound Volume	Total Volume
17:00 - 17:14	0	0	0
17:15 - 17:29	0	0	0
17:30 - 17:44	2	2	4
17:45 - 17:59	0	0	0
Hour Total	2	2	4
18:00 - 18:14	0	0	0
18:15 - 18:29	0	4	4
18:30 - 18:44	0	0	0
18:45 - 18:59	0	0	0
Hour Total	0	4	4
19:00 - 19:14	0	0	0
19:15 - 19:29	1	0	1
19:30 - 19:44	0	0	0
19:45 - 19:59	0	0	0
Hour Total	1	0	1
20:00 - 20:14	1	0	1
20:15 - 20:29	0	0	0
20:30 - 20:44	0	0	0
20:45 - 20:59	0	0	0
Hour Total	1	0	1
21:00 - 21:14	0	0	0
21:15 - 21:29	0	0	0
21:30 - 21:44	0	0	0
21:45 - 21:59	0	0	0
Hour Total	0	0	0
22:00 - 22:14	1	0	1
22:15 - 22:29	0	0	0
22:30 - 22:44	0	0	0
23:45 - 22:59	0	1	1
Hour Total	1	1	2
23:00 - 23:14	0	0	0
23:15 - 23:29	0	0	0
23:30 - 23:44	0	0	0
23:45 - 23:59	1	0	1
Hour Total	1	0	1
ADT :	27	38	65
Factored ADT :	27	38	65
AM Peak Time :	7:30- 8:30	5:45- 6:45	5:45- 6:45
AM Peak Volume:	6	12	12
PM Peak Time :	14:15-15:15	17:30-18:30	17:30-18:30
PM Peak Volume:	3	6	8

WEST COAST TRAFFIC COUNTERS

Location: DESERT CENTER RICE RD. BETWEEN RAGSDALE RD.& I-10
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:59	76	86	162 <
1:00 - 1:59	78	63	141
2:00 - 2:59	52	69	121
3:00 - 3:59	51	41	92
4:00 - 4:59	33	24	57
5:00 - 5:59	54	23	77
6:00 - 6:59	53	54	107
7:00 - 7:59	78	51	129
8:00 - 8:59	64	68	132
9:00 - 9:59	68	65	133
10:00 - 10:59	70	78	148
11:00 - 11:59	62	62	124
12:00 - 12:59	70	72	142
13:00 - 13:59	70	82	152
14:00 - 14:59	72	85	157
15:00 - 15:59	67	74	141
16:00 - 16:59	72	91	163
17:00 - 17:59	56	102	158
18:00 - 18:59	75	72	147
19:00 - 19:59	45	46	91
20:00 - 20:59	38	62	100
21:00 - 21:59	52	41	93
22:00 - 22:59	40	115	155
23:00 - 23:59	58	75	133
ADT :	1454	1601	3055
Factored ADT :	1454	1601	3055
AM Peak Time :	7:30- 8:30	0:15- 1:15	0:00- 1:00
AM Peak Volume:	79	92	162
PM Peak Time :	13:45-14:45	22:00-23:00	13:30-14:30
PM Peak Volume:	87	115	175

WEST COAST TRAFFIC COUNTERS

Location: DESERT CENTER RICE RD. BETWEEN RAGSDALE RD.& I-10
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:14	30	16	46
12:15 - 12:29	19	25	44
12:30 - 12:44	7	22	29
12:45 - 12:59	20	23	43
Hour Total	76	86	162
1:00 - 1:14	19	22	41
1:15 - 1:29	17	16	33
1:30 - 1:44	22	14	36
1:45 - 1:59	20	11	31
Hour Total	78	63	141
2:00 - 2:14	11	7	18
2:15 - 2:29	11	28	39
2:30 - 2:44	11	16	27
2:45 - 2:59	19	18	37
Hour Total	52	69	121
3:00 - 3:14	21	9	30
3:15 - 3:29	11	13	24
3:30 - 3:44	11	15	26
3:45 - 3:59	8	4	12
Hour Total	51	41	92
4:00 - 4:14	7	7	14
4:15 - 4:29	16	7	23
4:30 - 4:44	9	6	15
4:45 - 4:59	1	4	5
Hour Total	33	24	57
5:00 - 5:14	13	2	15
5:15 - 5:29	9	4	13
5:30 - 5:44	8	10	18
5:45 - 5:59	24	7	31
Hour Total	54	23	77
6:00 - 6:14	21	12	33
6:15 - 6:29	12	20	32
6:30 - 6:44	8	13	21
6:45 - 6:59	12	9	21
Hour Total	53	54	107
7:00 - 7:14	19	8	27
7:15 - 7:29	15	8	23
7:30 - 7:44	19	15	34
7:45 - 7:59	25	20	45
Hour Total	78	51	129

Location: DESERT CENTER RICE RD. BETWEEN RAGSDALE RD.& I-10
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
8:00 - 8:14	14	11	25
8:15 - 8:29	21	26	47
8:30 - 8:44	14	13	27
8:45 - 8:59	15	18	33
Hour Total	64	68	132
9:00 - 9:14	12	13	25
9:15 - 9:29	16	14	30
9:30 - 9:44	19	17	36
9:45 - 9:59	21	21	42
Hour Total	68	65	133
10:00 - 10:14	21	21	42
10:15 - 10:29	18	14	32
10:30 - 10:44	11	25	36
10:45 - 10:59	20	18	38
Hour Total	70	78	148
11:00 - 11:14	19	22	41
11:15 - 11:29	21	16	37
11:30 - 11:44	9	15	24
11:45 - 11:59	13	9	22
Hour Total	62	62	124
12:00 - 12:14	13	14	27
12:15 - 12:29	10	32	42
12:30 - 12:44	28	14	42
12:45 - 12:59	19	12	31
Hour Total	70	72	142
13:00 - 13:14	18	16	34
13:15 - 13:29	16	14	30
13:30 - 13:44	14	26	40
13:45 - 13:59	22	26	48
Hour Total	70	82	152
14:00 - 14:14	14	21	35
14:15 - 14:29	27	25	52
14:30 - 14:44	24	16	40
14:45 - 14:59	7	23	30
Hour Total	72	85	157
15:00 - 15:14	23	24	47
15:15 - 15:29	15	9	24
15:30 - 15:44	17	22	39
15:45 - 15:59	12	19	31
Hour Total	67	74	141
16:00 - 16:14	12	22	34
16:15 - 16:29	21	23	44
16:30 - 16:44	22	21	43
16:45 - 16:59	17	25	42
Hour Total	72	91	163

Location: DESERT CENTER RICE RD. BETWEEN RAGSDALE RD.& I-10
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
17:00 - 17:14	12	21	33
17:15 - 17:29	15	16	31
17:30 - 17:44	14	23	37
17:45 - 17:59	15	42	57
Hour Total	56	102	158
18:00 - 18:14	21	18	39
18:15 - 18:29	17	18	35
18:30 - 18:44	17	21	38
18:45 - 18:59	20	15	35
Hour Total	75	72	147
19:00 - 19:14	20	13	33
19:15 - 19:29	2	12	14
19:30 - 19:44	17	7	24
19:45 - 19:59	6	14	20
Hour Total	45	46	91
20:00 - 20:14	12	16	28
20:15 - 20:29	10	13	23
20:30 - 20:44	11	15	26
20:45 - 20:59	5	18	23
Hour Total	38	62	100
21:00 - 21:14	16	16	32
21:15 - 21:29	17	11	28
21:30 - 21:44	11	10	21
21:45 - 21:59	8	4	12
Hour Total	52	41	93
22:00 - 22:14	6	21	27
22:15 - 22:29	6	24	30
22:30 - 22:44	13	38	51
23:45 - 22:59	15	32	47
Hour Total	40	115	155
23:00 - 23:14	13	17	30
23:15 - 23:29	13	22	35
23:30 - 23:44	17	19	36
23:45 - 23:59	15	17	32
Hour Total	58	75	133
ADT :	1454	1601	3055
Factored ADT :	1454	1601	3055
AM Peak Time :	7:30- 8:30	0:15- 1:15	0:00- 1:00
AM Peak Volume:	79	92	162
PM Peak Time :	13:45-14:45	22:00-23:00	13:30-14:30
PM Peak Volume:	87	115	175

WEST COAST TRAFFIC COUNTERS

Location: KAISER RD. N/O DESERT RICE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:59	0	0	0
1:00 - 1:59	1	0	1
2:00 - 2:59	0	0	0
3:00 - 3:59	1	0	1
4:00 - 4:59	1	2	3
5:00 - 5:59	9	8	17
6:00 - 6:59	9	23	32
7:00 - 7:59	10	12	22
8:00 - 8:59	24	23	47
9:00 - 9:59	23	22	45
10:00 - 10:59	14	19	33
11:00 - 11:59	21	18	39
12:00 - 12:59	20	22	42
13:00 - 13:59	22	29	51
14:00 - 14:59	16	24	40
15:00 - 15:59	14	16	30
16:00 - 16:59	18	27	45
17:00 - 17:59	13	24	37
18:00 - 18:59	6	12	18
19:00 - 19:59	12	19	31
20:00 - 20:59	4	9	13
21:00 - 21:59	4	9	13
22:00 - 22:59	1	3	4
23:00 - 23:59	2	2	4
ADT :	245	323	568
Factored ADT :	245	323	568
AM Peak Time :	11:15-12:15	11:15-12:15	11:15-12:15
AM Peak Volume:	30	25	55
PM Peak Time :	12:00-13:00	16:15-17:15	16:15-17:15
PM Peak Volume:	25	32	54

WEST COAST TRAFFIC COUNTERS

Location: KAISER RD. N/O DESERT RICE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:14	0	0	0
12:15 - 12:29	0	0	0
12:30 - 12:44	0	0	0
12:45 - 12:59	0	0	0
Hour Total	0	0	0
1:00 - 1:14	0	0	0
1:15 - 1:29	0	0	0
1:30 - 1:44	1	0	1
1:45 - 1:59	0	0	0
Hour Total	1	0	1
2:00 - 2:14	0	0	0
2:15 - 2:29	0	0	0
2:30 - 2:44	0	0	0
2:45 - 2:59	0	0	0
Hour Total	0	0	0
3:00 - 3:14	0	0	0
3:15 - 3:29	1	0	1
3:30 - 3:44	0	0	0
3:45 - 3:59	0	0	0
Hour Total	1	0	1
4:00 - 4:14	0	0	0
4:15 - 4:29	1	1	2
4:30 - 4:44	0	0	0
4:45 - 4:59	0	1	1
Hour Total	1	2	3
5:00 - 5:14	1	2	3
5:15 - 5:29	2	0	2
5:30 - 5:44	3	1	4
5:45 - 5:59	3	5	8
Hour Total	9	8	17
6:00 - 6:14	4	5	9
6:15 - 6:29	3	5	8
6:30 - 6:44	1	3	4
6:45 - 6:59	1	10	11
Hour Total	9	23	32
7:00 - 7:14	2	3	5
7:15 - 7:29	1	5	6
7:30 - 7:44	6	1	7
7:45 - 7:59	1	3	4
Hour Total	10	12	22

Location: KAISER RD. N/O DESERT RICE RD.
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
8:00 - 8:14	5	3	8
8:15 - 8:29	6	12	18
8:30 - 8:44	5	3	8
8:45 - 8:59	8	5	13
Hour Total	24	23	47
9:00 - 9:14	4	1	5
9:15 - 9:29	6	9	15
9:30 - 9:44	4	4	8
9:45 - 9:59	9	8	17
Hour Total	23	22	45
10:00 - 10:14	4	2	6
10:15 - 10:29	3	4	7
10:30 - 10:44	3	9	12
10:45 - 10:59	4	4	8
Hour Total	14	19	33
11:00 - 11:14	2	2	4
11:15 - 11:29	7	4	11
11:30 - 11:44	7	5	12
11:45 - 11:59	5	7	12
Hour Total	21	18	39
12:00 - 12:14	11	9	20
12:15 - 12:29	2	6	8
12:30 - 12:44	7	6	13
12:45 - 12:59	0	1	1
Hour Total	20	22	42
13:00 - 13:14	6	9	15
13:15 - 13:29	5	5	10
13:30 - 13:44	4	10	14
13:45 - 13:59	7	5	12
Hour Total	22	29	51
14:00 - 14:14	7	5	12
14:15 - 14:29	3	8	11
14:30 - 14:44	2	7	9
14:45 - 14:59	4	4	8
Hour Total	16	24	40
15:00 - 15:14	5	4	9
15:15 - 15:29	4	3	7
15:30 - 15:44	2	2	4
15:45 - 15:59	3	7	10
Hour Total	14	16	30
16:00 - 16:14	2	4	6
16:15 - 16:29	5	7	12
16:30 - 16:44	7	5	12
16:45 - 16:59	4	11	15
Hour Total	18	27	45

Location: KAISER RD. N/O DESERT RICE RD.
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
17:00 - 17:14	6	9	15
17:15 - 17:29	2	3	5
17:30 - 17:44	4	6	10
17:45 - 17:59	1	6	7
Hour Total	13	24	37
18:00 - 18:14	1	1	2
18:15 - 18:29	3	3	6
18:30 - 18:44	1	6	7
18:45 - 18:59	1	2	3
Hour Total	6	12	18
19:00 - 19:14	7	6	13
19:15 - 19:29	3	7	10
19:30 - 19:44	1	3	4
19:45 - 19:59	1	3	4
Hour Total	12	19	31
20:00 - 20:14	1	1	2
20:15 - 20:29	0	4	4
20:30 - 20:44	3	4	7
20:45 - 20:59	0	0	0
Hour Total	4	9	13
21:00 - 21:14	1	3	4
21:15 - 21:29	2	2	4
21:30 - 21:44	1	0	1
21:45 - 21:59	0	4	4
Hour Total	4	9	13
22:00 - 22:14	0	1	1
22:15 - 22:29	1	1	2
22:30 - 22:44	0	0	0
23:45 - 22:59	0	1	1
Hour Total	1	3	4
23:00 - 23:14	0	0	0
23:15 - 23:29	0	1	1
23:30 - 23:44	1	1	2
23:45 - 23:59	1	0	1
Hour Total	2	2	4

ADT :	245	323	568
Factored ADT :	245	323	568
AM Peak Time :	11:15-12:15	11:15-12:15	11:15-12:15
AM Peak Volume:	30	25	55
PM Peak Time :	12:00-13:00	16:15-17:15	16:15-17:15
PM Peak Volume:	25	32	54

WEST COAST TRAFFIC COUNTERS

Location: KAISER RD. N/O LAKE TAMARISK DR.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:59	0	0	0
1:00 - 1:59	1	0	1
2:00 - 2:59	0	0	0
3:00 - 3:59	3	2	5
4:00 - 4:59	0	3	3
5:00 - 5:59	6	7	13
6:00 - 6:59	6	24	30
7:00 - 7:59	6	13	19
8:00 - 8:59	14	13	27
9:00 - 9:59	14	7	21
10:00 - 10:59	11	15	26
11:00 - 11:59	12	6	18
12:00 - 12:59	11	9	20
13:00 - 13:59	19	13	32
14:00 - 14:59	10	11	21
15:00 - 15:59	13	10	23
16:00 - 16:59	26	21	47
17:00 - 17:59	17	10	27
18:00 - 18:59	7	10	17
19:00 - 19:59	8	8	16
20:00 - 20:59	2	4	6
21:00 - 21:59	8	7	15
22:00 - 22:59	1	4	5
23:00 - 23:59	1	2	3
ADT :	196	199	395
Factored ADT :	196	199	395
AM Peak Time :	9:30-10:30	6:00- 7:00	6:15- 7:15
AM Peak Volume:	16	24	31
PM Peak Time :	16:15-17:15	16:00-17:00	16:15-17:15
PM Peak Volume:	29	21	49

WEST COAST TRAFFIC COUNTERS

Location: KAISER RD. N/O LAKE TAMARISK DR.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
Mid - 12:14	0	0	0
12:15 - 12:29	0	0	0
12:30 - 12:44	0	0	0
12:45 - 12:59	0	0	0
Hour Total	0	0	0
1:00 - 1:14	0	0	0
1:15 - 1:29	0	0	0
1:30 - 1:44	1	0	1
1:45 - 1:59	0	0	0
Hour Total	1	0	1
2:00 - 2:14	0	0	0
2:15 - 2:29	0	0	0
2:30 - 2:44	0	0	0
2:45 - 2:59	0	0	0
Hour Total	0	0	0
3:00 - 3:14	0	0	0
3:15 - 3:29	3	1	4
3:30 - 3:44	0	1	1
3:45 - 3:59	0	0	0
Hour Total	3	2	5
4:00 - 4:14	0	0	0
4:15 - 4:29	0	1	1
4:30 - 4:44	0	0	0
4:45 - 4:59	0	2	2
Hour Total	0	3	3
5:00 - 5:14	0	0	0
5:15 - 5:29	2	1	3
5:30 - 5:44	0	1	1
5:45 - 5:59	4	5	9
Hour Total	6	7	13
6:00 - 6:14	1	2	3
6:15 - 6:29	0	5	5
6:30 - 6:44	3	9	12
6:45 - 6:59	2	8	10
Hour Total	6	24	30
7:00 - 7:14	3	1	4
7:15 - 7:29	0	5	5
7:30 - 7:44	2	4	6
7:45 - 7:59	1	3	4
Hour Total	6	13	19

Location: KAISER RD. N/O LAKE TAMARISK DR.
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
8:00 - 8:14	3	0	3
8:15 - 8:29	2	9	11
8:30 - 8:44	3	3	6
8:45 - 8:59	6	1	7
Hour Total	14	13	27
9:00 - 9:14	1	0	1
9:15 - 9:29	1	2	3
9:30 - 9:44	7	3	10
9:45 - 9:59	5	2	7
Hour Total	14	7	21
10:00 - 10:14	1	1	2
10:15 - 10:29	3	4	7
10:30 - 10:44	3	6	9
10:45 - 10:59	4	4	8
Hour Total	11	15	26
11:00 - 11:14	2	1	3
11:15 - 11:29	5	1	6
11:30 - 11:44	2	2	4
11:45 - 11:59	3	2	5
Hour Total	12	6	18
12:00 - 12:14	1	2	3
12:15 - 12:29	1	2	3
12:30 - 12:44	9	1	10
12:45 - 12:59	0	4	4
Hour Total	11	9	20
13:00 - 13:14	3	4	7
13:15 - 13:29	4	5	9
13:30 - 13:44	5	3	8
13:45 - 13:59	7	1	8
Hour Total	19	13	32
14:00 - 14:14	5	2	7
14:15 - 14:29	2	3	5
14:30 - 14:44	1	3	4
14:45 - 14:59	2	3	5
Hour Total	10	11	21
15:00 - 15:14	3	3	6
15:15 - 15:29	3	2	5
15:30 - 15:44	5	3	8
15:45 - 15:59	2	2	4
Hour Total	13	10	23
16:00 - 16:14	5	5	10
16:15 - 16:29	8	4	12
16:30 - 16:44	5	5	10
16:45 - 16:59	8	7	15
Hour Total	26	21	47

Location: KAISER RD. N/O LAKE TAMARISK DR.
Count Date: Wednesday - November 29, 1989

Time	SouthBound Volume	NorthBound Volume	Total Volume
17:00 - 17:14	8	4	12
17:15 - 17:29	6	1	7
17:30 - 17:44	2	2	4
17:45 - 17:59	1	3	4
Hour Total	17	10	27
18:00 - 18:14	2	2	4
18:15 - 18:29	2	3	5
18:30 - 18:44	2	3	5
18:45 - 18:59	1	2	3
Hour Total	7	10	17
19:00 - 19:14	3	1	4
19:15 - 19:29	3	4	7
19:30 - 19:44	1	0	1
19:45 - 19:59	1	3	4
Hour Total	8	8	16
20:00 - 20:14	1	1	2
20:15 - 20:29	0	2	2
20:30 - 20:44	1	1	2
20:45 - 20:59	0	0	0
Hour Total	2	4	6
21:00 - 21:14	5	3	8
21:15 - 21:29	1	0	1
21:30 - 21:44	2	1	3
21:45 - 21:59	0	3	3
Hour Total	8	7	15
22:00 - 22:14	1	1	2
22:15 - 22:29	0	1	1
22:30 - 22:44	0	1	1
23:45 - 22:59	0	1	1
Hour Total	1	4	5
23:00 - 23:14	0	0	0
23:15 - 23:29	1	1	2
23:30 - 23:44	0	1	1
23:45 - 23:59	0	0	0
Hour Total	1	2	3
ADT :	196	199	395
Factored ADT :	196	199	395
AM Peak Time :	9:30-10:30	6:00- 7:00	6:15- 7:15
AM Peak Volume:	16	24	31
PM Peak Time :	16:15-17:15	16:00-17:00	16:15-17:15
PM Peak Volume:	29	21	49

WEST COAST TRAFFIC COUNTERS

Location: DESERT CANYON RICE RD.BETWEEN W/B I-10 RAMPS 7 RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
Mid - 0:59	0	14	2	0	0	0	0	0	8	2	8	4	0	37
1:00 - 1:59	0	6	4	0	0	0	0	0	8	0	10	1	0	29
2:00 - 2:59	0	4	1	0	0	0	0	0	6	0	9	4	0	24
3:00 - 3:59	0	6	0	0	0	0	0	0	6	0	3	2	0	17
4:00 - 4:59	0	8	0	0	0	0	0	0	2	0	1	0	0	11
5:00 - 5:59	0	14	0	0	0	0	0	0	3	0	0	0	0	17
6:00 - 6:59	0	15	4	0	1	0	0	0	9	0	0	1	0	29
7:00 - 7:59	0	22	7	0	0	0	0	0	6	0	0	0	0	35
8:00 - 8:59	0	26	4	0	1	1	0	0	7	1	3	0	0	43
9:00 - 9:59	0	31	8	0	2	0	0	0	6	0	0	0	1	48
10:00 - 10:59	1	51	5	0	0	0	0	0	4	0	2	0	0	59
11:00 - 11:59	0	41	5	0	0	1	0	0	4	0	0	0	0	48
Noon - 12:59	0	34	5	0	2	1	0	0	3	0	5	0	1	50
13:00 - 13:59	0	36	3	1	0	0	0	0	6	0	3	0	0	46
14:00 - 14:59	0	49	3	0	0	0	0	0	6	0	0	2	1	59
15:00 - 15:59	0	44	6	1	1	0	0	0	3	0	2	0	1	57
16:00 - 16:59	0	46	13	1	0	0	0	0	8	0	1	0	0	65
17:00 - 17:59	0	38	5	0	2	0	0	0	12	0	2	2	1	60
18:00 - 18:59	1	27	3	0	0	1	0	0	9	0	4	0	0	44
19:00 - 19:59	0	18	2	0	0	0	0	0	4	0	2	0	0	24
20:00 - 20:59	0	21	0	0	0	0	0	0	5	0	7	0	0	32
21:00 - 21:59	0	17	3	0	0	0	0	0	5	0	2	0	0	27
22:00 - 22:59	0	14	7	0	0	0	0	0	20	0	5	3	0	48
23:00 - 23:59	0	28	2	0	0	0	0	0	11	0	4	1	0	42
Totals:	2	610	92	3	9	4	0	0	161	3	73	20	5	951
% of Totals:	0	64	10	0	1	0	0	0	17	0	8	2	1	100
% of AM:	0	25	4	0	0	0	0	0	7	0	4	1	0	42
% of PM:	0	39	5	0	1	0	0	0	10	0	4	1	0	58

Truck Summary:

Total Trucks (#3 thru #13):	370
% of Total Trucks:	39
% of AM Trucks:	18
% of PM Trucks:	21

Classification Legend:

Num	Definition	Num	Definiton	Num	Definiton
#1	Motocycles - 2 Axles	#6	Single Unit Truck - 3 Axles	#11	Multi-Unit - 5 Axles or Less
#2	Passenger Car - 2 Axles	#7	Single Unit - 4 Axles	#12	Multi-Unit - 6 Axles
#3	Pickup Truck, Vans - 2 Axles	#8	Single Unit - 4 Axles or Less	#13	Multi-Unit - 7 Axles or More
#4	Busses	#9	Double Unit - 5 Axles		
#5	Single Unit - 2 Axles, 6 Tires	#10	Double Unit - 6 Axles or More		

WEST COAST TRAFFIC COUNTERS

Location: DESERT CANYON RICE RD.BETWEEN W/B I-10 RAMPS 7 RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
Mid - 12:14	0	3	0	0	0	0	0	0	2	0	1	0	0	0
12:15 - 12:29	0	4	1	0	0	0	0	0	2	0	0	4	0	0
12:30 - 12:44	0	5	1	0	0	0	0	0	1	1	3	0	0	0
12:45 - 12:59	0	2	0	0	0	0	0	0	3	1	4	0	0	0
Hour Total	0	14	2	0	0	0	0	0	8	2	8	4	0	37
1:00 - 1:14	0	1	1	0	0	0	0	0	4	0	4	0	0	0
1:15 - 1:29	0	2	1	0	0	0	0	0	3	0	2	0	0	0
1:30 - 1:44	0	1	2	0	0	0	0	0	1	0	1	1	0	0
1:45 - 1:59	0	2	0	0	0	0	0	0	0	0	3	0	0	0
Hour Total	0	6	4	0	0	0	0	0	8	0	10	1	0	29
2:00 - 2:14	0	0	0	0	0	0	0	0	0	0	2	0	0	0
2:15 - 2:29	0	2	0	0	0	0	0	0	4	0	4	0	0	0
2:30 - 2:44	0	0	0	0	0	0	0	0	1	0	3	2	0	0
2:45 - 2:59	0	2	1	0	0	0	0	0	1	0	0	2	0	0
Hour Total	0	4	1	0	0	0	0	0	6	0	9	4	0	24
3:00 - 3:14	0	3	0	0	0	0	0	0	2	0	1	0	0	0
3:15 - 3:29	0	2	0	0	0	0	0	0	2	0	1	0	0	0
3:30 - 3:44	0	1	0	0	0	0	0	0	0	0	1	2	0	0
3:45 - 3:59	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Hour Total	0	6	0	0	0	0	0	0	6	0	3	2	0	17
4:00 - 4:14	0	2	0	0	0	0	0	0	1	0	0	0	0	0
4:15 - 4:29	0	3	0	0	0	0	0	0	0	0	0	0	0	0
4:30 - 4:44	0	2	0	0	0	0	0	0	1	0	0	0	0	0
4:45 - 4:59	0	1	0	0	0	0	0	0	0	0	1	0	0	0
Hour Total	0	8	0	0	0	0	0	0	2	0	1	0	0	11
5:00 - 5:14	0	2	0	0	0	0	0	0	0	0	0	0	0	0
5:15 - 5:29	0	4	0	0	0	0	0	0	0	0	0	0	0	0
5:30 - 5:44	0	1	0	0	0	0	0	0	3	0	0	0	0	0
5:45 - 5:59	0	7	0	0	0	0	0	0	0	0	0	0	0	0
Hour Total	0	14	0	0	0	0	0	0	3	0	0	0	0	17
6:00 - 6:14	0	3	1	0	0	0	0	0	1	0	0	1	0	0
6:15 - 6:29	0	4	0	0	0	0	0	0	4	0	0	0	0	0
6:30 - 6:44	0	3	1	0	1	0	0	0	3	0	0	0	0	0
6:45 - 6:59	0	5	2	0	0	0	0	0	1	0	0	0	0	0
Hour Total	0	15	4	0	1	0	0	0	9	0	0	1	0	29
7:00 - 7:14	0	4	1	0	0	0	0	0	1	0	0	0	0	0
7:15 - 7:29	0	3	0	0	0	0	0	0	1	0	0	0	0	0
7:30 - 7:44	0	6	3	0	0	0	0	0	1	0	0	0	0	0
7:45 - 7:59	0	9	3	0	0	0	0	0	3	0	0	0	0	0
Hour Total	0	22	7	0	0	0	0	0	6	0	0	0	0	35
8:00 - 8:14	0	7	1	0	0	0	0	0	1	0	1	0	0	0
8:15 - 8:29	0	10	0	0	1	1	0	0	1	0	1	0	0	0
8:30 - 8:44	0	2	0	0	0	0	0	0	4	0	0	0	0	0
8:45 - 8:59	0	7	3	0	0	0	0	0	1	1	1	0	0	0
Hour Total	0	26	4	0	1	1	0	0	7	1	3	0	0	43
9:00 - 9:14	0	8	2	0	0	0	0	0	1	0	0	0	0	0
9:15 - 9:29	0	10	2	0	2	0	0	0	0	0	0	0	0	0

WEST COAST TRAFFIC COUNTERS

Location: DESERT CANYON RICE RD.BETWEEN W/B I-10 RAMPS 7 RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
9:30 - 9:44	0	8	2	0	0	0	0	0	2	0	0	0	0	0
9:45 - 9:59	0	5	2	0	0	0	0	0	3	0	0	0	1	1
Hour Total	0	31	8	0	2	0	0	0	6	0	0	0	1	48
10:00 - 10:14	0	12	2	0	0	0	0	0	1	0	1	0	0	0
10:15 - 10:29	0	12	1	0	0	0	0	0	0	0	0	0	0	0
10:30 - 10:44	0	15	0	0	0	0	0	0	3	0	1	0	0	0
10:45 - 10:59	1	12	2	0	0	0	0	0	0	0	0	0	0	0
Hour Total	1	51	5	0	0	0	0	0	4	0	2	0	0	59
11:00 - 11:14	0	11	2	0	0	1	0	0	2	0	0	0	0	0
11:15 - 11:29	0	11	1	0	0	0	0	0	1	0	0	0	0	0
11:30 - 11:44	0	11	1	0	0	0	0	0	1	0	0	0	0	0
11:45 - 11:59	0	8	1	0	0	0	0	0	0	0	0	0	0	0
Hour Total	0	41	5	0	0	1	0	0	4	0	0	0	0	48
12:00 - 12:14	0	5	1	0	0	0	0	0	1	0	2	0	0	0
12:15 - 12:29	0	15	2	0	1	1	0	0	1	0	1	0	1	1
12:30 - 12:44	0	8	1	0	1	0	0	0	0	0	1	0	0	0
12:45 - 12:59	0	6	1	0	0	0	0	0	1	0	1	0	0	0
Hour Total	0	34	5	0	2	1	0	0	3	0	5	0	1	50
13:00 - 13:14	0	11	0	0	0	0	0	0	1	0	0	0	0	0
13:15 - 13:29	0	6	1	0	0	0	0	0	0	0	2	0	0	0
13:30 - 13:44	0	9	1	1	0	0	0	0	1	0	1	0	0	0
13:45 - 13:59	0	10	1	0	0	0	0	0	4	0	0	0	0	0
Hour Total	0	36	3	1	0	0	0	0	6	0	3	0	0	46
14:00 - 14:14	0	11	0	0	0	0	0	0	1	0	0	0	1	1
14:15 - 14:29	0	16	1	0	0	0	0	0	2	0	0	1	0	0
14:30 - 14:44	0	10	1	0	0	0	0	0	2	0	0	0	0	0
14:45 - 14:59	0	12	1	0	0	0	0	0	1	0	0	1	0	0
Hour Total	0	49	3	0	0	0	0	0	6	0	0	2	1	59
15:00 - 15:14	0	21	1	0	1	0	0	0	1	0	0	0	0	0
15:15 - 15:29	0	7	1	1	0	0	0	0	0	0	0	0	0	0
15:30 - 15:44	0	11	2	0	0	0	0	0	0	0	2	0	0	0
15:45 - 15:59	0	5	2	0	0	0	0	0	2	0	0	0	1	1
Hour Total	0	44	6	1	1	0	0	0	3	0	2	0	1	57
16:00 - 16:14	0	13	2	0	0	0	0	0	2	0	0	0	0	0
16:15 - 16:29	0	8	3	0	0	0	0	0	4	0	0	0	0	0
16:30 - 16:44	0	12	4	0	0	0	0	0	2	0	0	0	0	0
16:45 - 16:59	0	13	4	1	0	0	0	0	0	0	1	0	0	0
Hour Total	0	46	13	1	0	0	0	0	8	0	1	0	0	65
17:00 - 17:14	0	15	1	0	0	0	0	0	1	0	0	0	0	0
17:15 - 17:29	0	7	1	0	2	0	0	0	1	0	1	0	0	0
17:30 - 17:44	0	8	2	0	0	0	0	0	3	0	0	0	1	1
17:45 - 17:59	0	8	1	0	0	0	0	0	7	0	1	2	0	0
Hour Total	0	38	5	0	2	0	0	0	12	0	2	2	1	60
18:00 - 18:14	0	4	2	0	0	0	0	0	3	0	1	0	0	0
18:15 - 18:29	1	8	1	0	0	0	0	0	3	0	0	0	0	0
18:30 - 18:44	0	7	0	0	0	1	0	0	1	0	2	0	0	0
18:45 - 18:59	0	8	0	0	0	0	0	0	2	0	1	0	0	0

WEST COAST TRAFFIC COUNTERS

Location: DESERT CANYON RICE RD.BETWEEN W/B I-10 RAMPS 7 RAGSDALE RD.
Count Interval: 15 minutes
Count Date: Wednesday - November 29, 1989

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
Hour Total	1	27	3	0	0	1	0	0	9	0	4	0	0	44
19:00 - 19:14	0	6	2	0	0	0	0	0	0	0	0	0	0	0
19:15 - 19:29	0	5	0	0	0	0	0	0	0	0	2	0	0	0
19:30 - 19:44	0	4	0	0	0	0	0	0	1	0	0	0	0	0
19:45 - 19:59	0	3	0	0	0	0	0	0	3	0	0	0	0	0
Hour Total	0	18	2	0	0	0	0	0	4	0	2	0	0	24
20:00 - 20:14	0	8	0	0	0	0	0	0	2	0	1	0	0	0
20:15 - 20:29	0	3	0	0	0	0	0	0	0	0	3	0	0	0
20:30 - 20:44	0	6	0	0	0	0	0	0	3	0	0	0	0	0
20:45 - 20:59	0	4	0	0	0	0	0	0	0	0	3	0	0	0
Hour Total	0	21	0	0	0	0	0	0	5	0	7	0	0	32
21:00 - 21:14	0	5	0	0	0	0	0	0	1	0	2	0	0	0
21:15 - 21:29	0	7	1	0	0	0	0	0	1	0	0	0	0	0
21:30 - 21:44	0	1	2	0	0	0	0	0	3	0	0	0	0	0
21:45 - 21:59	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Hour Total	0	17	3	0	0	0	0	0	5	0	2	0	0	27
22:00 - 22:14	0	1	0	0	0	0	0	0	7	0	0	0	0	0
22:15 - 22:29	0	3	5	0	0	0	0	0	5	0	0	0	0	0
22:30 - 22:44	0	4	1	0	0	0	0	0	5	0	3	1	0	0
23:45 - 22:59	0	6	1	0	0	0	0	0	3	0	2	2	0	0
Hour Total	0	14	7	0	0	0	0	0	20	0	5	3	0	48
23:00 - 23:14	0	3	0	0	0	0	0	0	4	0	1	0	0	0
23:15 - 23:29	0	7	0	0	0	0	0	0	4	0	1	0	0	0
23:30 - 23:44	0	10	1	0	0	0	0	0	3	0	1	0	0	0
23:45 - 23:59	0	8	1	0	0	0	0	0	0	0	1	1	0	0
Hour Total	0	28	2	0	0	0	0	0	11	0	4	1	0	42
Totals:	2	610	92	3	9	4	0	0	161	3	73	20	5	951
% of Totals:	0	64	10	0	1	0	0	0	17	0	8	2	1	100
% of AM:	0	25	4	0	0	0	0	0	7	0	4	1	0	42
% of PM:	0	39	5	0	1	0	0	0	10	0	4	1	0	58

Truck Summary:

Total Trucks (#3 thru #13):	370
% of Total Trucks:	39
% of AM Trucks:	18
% of PM Trucks:	21

Classification Legend:

Num	Definition	Num	Definiton	Num	Definiton
#1	Motocycles - 2 Axles	#6	Single Unit Truck - 3 Axles	#11	Multi-Unit - 5 Axles or Less
#2	Passenger Car - 2 Axles	#7	Single Unit - 4 Axles	#12	Multi-Unit - 6 Axles
#3	Pickup Truck, Vans - 2 Axles	#8	Single Unit - 4 Axles or Less	#13	Multi-Unit - 7 Axles or More
#4	Busses	#9	Double Unit - 5 Axles		
#5	Single Unit - 2 Axles, 6 Tires	#10	Double Unit - 6 Axles or More		

APPENDIX C
Existing Traffic Operating Conditions
Level of Service Analysis Worksheets

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Eagle Mtn n/o Ragsdale
ANALYST.............. cdw
TIME OF ANALYSIS..... 1989 EXISTING
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.5
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	100 / 0
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.71	.88
B	2.2	2	2.5	.92	.71	.86
C	2.2	2	2.5	.92	.71	.86
D	2	1.6	1.6	.92	.71	.88
E	2	1.6	1.6	.97	.71	.88

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 12
ACTUAL FLOW RATE: 24

LOS	SERVICE FLOW RATE	V/C
A	193	.12
B	376	.24
C	611	.39
D	995	.62
E	1692	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Desert Ctr Rice Rd
ANALYST.............. cdw
TIME OF ANALYSIS..... 1989 EXISTING
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.85
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	.88
B	2.2	2	2.5	.92	.94	.86
C	2.2	2	2.5	.92	.94	.86
D	2	1.6	1.6	.92	.94	.88
E	2	1.6	1.6	.97	.94	.88

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 51
ACTUAL FLOW RATE: 60

LOS	SERVICE FLOW RATE	V/C
A	255	.12
B	498	.24
C	809	.39
D	1317	.62
E	2240	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Lake Tamarisk Dr
ANALYST.............. cdw
TIME OF ANALYSIS..... 1989 EXISTING
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	.14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.82
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	1
B	2.2	2	2.5	.92	.94	1
C	2.2	2	2.5	.92	.94	1
D	2	1.6	1.6	.92	.94	1
E	2	1.6	1.6	.97	.94	1

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 49
ACTUAL FLOW RATE: 60

LOS	SERVICE FLOW RATE	V/C
A	290	.12
B	580	.24
C	943	.39
D	1499	.62
E	2549	1

LOS FOR GIVEN CONDITIONS: A

****

L1,EX.

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. 1

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 Eastbound

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain

NAME OF THE ANALYST.............................. GJH

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/20/89

TIME PERIOD ANALYZED............................. Peak

OTHER INFORMATION:

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	8	0	0	1
THRU	0	0	0	0
RIGHT	0	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	2	1	1	1
LANE USAGE	LT - R	LTR		

L1 EX

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

L1 EX

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	919	918 >	918 >	918 >	A
THROUGH	0	998	998 >	0 998 >	0 998 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	9	918	917 >	0 917 >	0 909 >	A
THROUGH	0	998	997 >	997 >	997 >	A
RIGHT	0	1000	1000	1000	1000	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	1	1000	1000	1000	999	A

****

L2EX

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................ 1

AREA POPULATION................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 Westbound

NAME OF THE NORTH/SOUTH STREET.................. Eagle Mountain

NAME OF THE ANALYST.............................. GJH

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/20/89

TIME PERIOD ANALYZED............................. Peak

OTHER INFORMATION:

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	0	0
THRU	0	0	0	0
RIGHT	0	3	0	10

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	2	1	1
LANE USAGE	LTR	LT + R		

L2EX

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

L2FX

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)		SHARED CAPACITY c_{SH} (pcph)		RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET								
WB LEFT	0	910	910	>	0 910	>	0 910 >	A
THROUGH	0	990	990	>	990	>	990 >	A
RIGHT	3	1000	1000		1000		997	A
MINOR STREET								
EB LEFT	0	912	910	>	910	>	910 >	A
THROUGH	0	995	995	>	0 995	>	0 995 >	A
RIGHT	0	1000	1000	>	1000	>	1000 >	A
MAJOR STREET								
NB LEFT	0	1000	1000		1000		1000	A
SB LEFT	0	1000	1000		1000		1000	A

L3EX

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. 1

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... Ragsdale Road

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain

NAME OF THE ANALYST.............................. GJH

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/20/89

TIME PERIOD ANALYZED............................. Peak

OTHER INFORMATION:

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	0	0	2
THRU	--	0	0	10
RIGHT	--	0	3	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	1	1	1

L3EX

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	0	0	0
SOUTHBOUND	0	0	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50

L3 EX

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_F (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)		SHARED CAPACITY c_{SH} (pcph)		RESERVE CAPACITY $c_R = c_{SH} - v$		LOS
MINOR STREET									
WB LEFT	0	907	905	>	905	>	905	>	A
				>	0	>	0	>	
RIGHT	0	1000	1000	>	1000	>	1000	>	A
MAJOR STREET									
SB LEFT	2	1000	1000		1000		998		A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 EASTBOUND RAMPS

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

L4EX

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1989 EXISTING CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	41	0	0	21
THRU	2	0	1	0
RIGHT	2	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

L4EX

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

CAPACITY AND LEVEL-OF-SERVICE

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	891	872 >	872 >	872 >	A
THROUGH	0	974	956 >	0 956 >	0 956 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	58	894	878 >	878 >	820 >	A
THROUGH	3	973	956 >	886 956 >	623 953 >A	A
RIGHT	3	1000	1000 >	1000 >	997 >	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	30	1000	1000	1000	970	A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 WESTBOUND RAMPS

L5 EX.

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

NAME OF THE ANALYST.............................. CDK

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1989 EXISTING CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	1	0
THRU	0	0	35	20
RIGHT	0	17	0	24

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

L5-EX

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	1	27	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	831	830 >	830 >	830 >	A
THROUGH	0	907	906 >	998 906 >	974 906 >	A
RIGHT	24	998	998 >	998 >	974 >	A
MINOR STREET						
EB LEFT	0	826	813 >	813 >	813 >	A
THROUGH	0	921	920 >	0 920 >	0 920 >	A
RIGHT	0	998	998 >	998 >	998 >	A
MAJOR STREET						
NB LEFT	1	1000	1000	1000	999	A
SB LEFT	0	1000	1000	1000	1000	A

45 EX

APPENDIX D
Future Conditions Without the Project
At-grade Crossing Analysis

EAGLE MOUNTAIN

Future No-Build Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1B.WK1

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs	1995 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO- TEC- TION	RELATIVE HAZARD (Pf)	NO-BUILD HAZARD INDEX
SEGMENT 1: EAGLE MOUNTAIN TO COLTON/SAN BERN. TRNSFR. STN.											
Parkside Dr.	2	332	65	1.5	0.3	0.00	0.0	31	8	0.2	2,058
Bay Dr.	2	676	65	1.5	0.6	0.01	1.0	31	8	0.2	4,192
Cleveland St.	2	74	65	1.5	0.1	0.00	0.0	31	9	0.11	252
66th Ave.	2	3,848	65	1.6	3.6	0.04	0.7	31	9	0.11	13,120
62nd Ave.	2	602	65	1.5	0.5	0.01	1.2	31	9	0.11	2,054
58th Ave.	2	774	65	1.5	0.7	0.01	0.9	31	8	0.2	4,801
Airport Blvd.	2	5,642	65	1.6	5.4	0.05	0.6	31	9	0.11	19,240
52nd Ave.	2	1,217	65	1.5	1.1	0.01	0.5	30	9	0.11	4,016
5th St.	2	252	65	1.5	0.2	0.00	0.0	28	8	0.2	1,411
50th Ave.	2	1,398	65	1.5	1.3	0.01	0.5	28	8	0.2	7,827
Dillon Rd.	2	7,130	65	1.6	6.9	0.06	0.5	31	9	0.11	24,312
Monroe St.	2	9,124	30	2.6	14.9	0.21	0.8	28	9	0.11	28,100
Tipton	2	111	40	1.9	0.1	0.00	0.0	36	8	0.2	797
Broadway	2	1,832	40	2.0	2.2	0.03	0.8	36	9	0.11	7,253
Apache Trail	2	3,712	40	2.0	4.6	0.06	0.8	6	9	0.11	2,450
Hargrave	2	3,700	40	2.0	4.6	0.06	0.8	35	9	0.11	14,245
San Gorgonio	2	3,626	40	2.0	4.5	0.06	0.8	34	9	0.11	13,562
22nd St.	2	6,969	40	2.1	9.0	0.11	0.7	35	9	0.11	26,829
North Sunset	2	652	40	2.0	0.8	0.01	0.8	35	9	0.11	2,508
Highland Springs	2	283	40	1.9	0.3	0.00	0.0	36	9	0.11	1,120
Pennsylvania	2	615	50	1.7	0.6	0.01	1.0	35	9	0.11	2,366
Beaumont St.	2	4,179	50	1.8	4.5	0.05	0.7	35	9	0.11	16,091
California	2	1,414	50	1.7	1.5	0.02	0.8	35	9	0.11	5,443
Veile Ave.	2	492	50	1.7	0.5	0.01	1.2	35	8	0.2	3,442
San Timoteo Canyon Rd.	2	443	50	1.7	0.5	0.01	1.2	36	9	0.11	1,752
Live Oak Canyon	2	947	40	2.0	1.1	0.02	1.1	6	9	0.11	625
Alessandro Rd.	2	3,815	40	2.0	4.7	0.06	0.8	50	9	0.11	20,985

EAGLE MOUNTAIN

Future No-Build Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1B.WK1

SAFETY ANALYSIS

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs	1995 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	NO-BUILD HAZARD INDEX
San Timoteo Canyon Rd.	2	5,968	40	2.1	7.6	0.09	0.7	50	9	0.11	32,823
Beaumont Ave.	2	958	40	2.0	1.1	0.02	1.1	50	9	0.11	5,268
Whittier Ave.	2	174	40	1.9	0.2	0.00	0.0	50	9	0.11	957
Hunts Ln.	2	11,780	50	2.0	14.2	0.13	0.5	50	9	0.11	64,791
						1.16					
SEGMENT 2: KAISER SPUR TO INDUSTRY TRANSFER STATION											
Milliken Ave.	6	24,728	65	1.7	24.5	0.21	0.5	35	9	0.11	95,203
Vineyard Ave.	4	23,459	60	1.8	25.6	0.21	0.5	35	9	0.11	90,319
						0.42					
SEGMENT 3: INDUSTRY TRANS. STN. TO INDUSTRY BRANCH POINT											
Nogales St.	5	29,554	60	1.8	32.3	0.26	0.5	28	9	0.11	91,028
Sunset Ave.	5	16,711	60	1.7	16.9	0.16	0.6	28	9	0.11	51,470
						0.42					
SEGMENT 4: INDUSTRY BRANCH POINT TO S. PACIFIC'S L.A. YARD											
Ramona	4	32,133	30	2.9	58.9	0.65	0.7	28	9	0.11	98,969
Valley	4	20,221	25	3.0	38.5	0.59	0.9	28	9	0.11	62,280
						1.24					
SEGMENT 5: SOUTHERN PACIFIC'S L.A. YARD to N. ORANGE COUNTY											
Washington Blvd.	4	25,942	10	6.5	110.0	3.30	1.8	NA	NA	NA	ERR
Santa Fe Ave.	4	16,435	10	6.1	64.7	2.25	2.1	NA	NA	NA	ERR

EAGLE MOUNTAIN

Future No-Build Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1B.WK1

SAFETY ANALYSIS

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	NO-BUILD HAZARD INDEX
25th Street	4	4,834	10	5.6	17.5	0.72	2.5	NA	NA	NA	ERR
E. Alameda St.	2	8,594	10	6.1	33.8	1.16	2.1	NA	NA	NA	ERR
41st Street	2	10,656	10	6.3	43.3	1.39	1.9	24	4	0.34	86,953
Vernon Ave.	5	12,998	10	5.8	49.1	1.87	2.3	4	4	0.34	17,677
55th St.	2	6,649	10	5.9	25.4	0.92	2.2	28	4	0.34	63,301
Slauson Ave.	4	30,400	10	6.8	133.7	3.73	1.7	28	8	0.2	170,238
Gage Ave.	3	18,369	20	3.7	42.8	0.73	1.0	28	8	0.2	102,865
Florence Ave.	6	28,262	20	3.5	63.6	1.19	1.1	28	8	0.2	158,268
Nadeau St.	5	13,427	20	3.3	28.3	0.60	1.3	28	9	0.11	41,357
Santa Fe Ave.	4	9,560	15	4.1	25.2	0.68	1.6	20	9	0.11	21,033
Long Beach Blvd.	4	19,658	15	4.4	56.0	1.31	1.4	20	9	0.11	43,247
State St.	4	12,890	20	3.4	27.5	0.56	1.2	10	9	0.11	14,179
Otis Ave.	4	12,890	20	3.4	27.5	0.56	1.2	30	9	0.11	42,538
Atlantic Ave.	6	26,855	20	3.5	60.0	1.14	1.1	10	9	0.11	29,540
Garfield Ave.	6	25,888	20	3.5	57.5	1.11	1.2	10	9	0.11	28,477
Firestone Blvd.	8	46,298	20	3.7	108.1	1.91	1.1	6	9	0.11	30,557
Paramount Blvd.	6	26,533	20	3.5	59.2	1.13	1.1	10	9	0.11	29,186
Lakewood Blvd.	6	36,523	20	3.7	85.8	1.48	1.0	10	9	0.11	40,175
Woodruff Ave.	4	15,039	20	3.4	32.7	0.65	1.2	4	9	0.11	6,617
Studebaker Rd.	4	13,127	20	3.4	28.1	0.57	1.2	6	8	0.2	15,752
Pioneer Blvd.	4	16,059	20	3.5	35.1	0.68	1.2	6	9	0.11	10,599
San Antonio Blvd.	4	18,906	20	3.5	42.2	0.79	1.1	2	9	0.11	4,159
Rosecrans Ave.	6	30,077	20	3.6	68.3	1.26	1.1	6	9	0.11	19,851
Artesia Blvd.	6	27,175	20	3.5	60.8	1.16	1.1	12	9	0.11	35,871
Knott Ave.	4	21,740	20	3.6	49.6	0.89	1.1	12	9	0.11	28,697
Western Ave.	4	16,305	20	3.5	35.7	0.69	1.2	12	9	0.11	21,523
Beach Blvd.	6	36,958	20	3.7	87.0	1.49	1.0	30	9	0.11	121,961
Stanton Ave.	4	12,609	20	3.4	26.9	0.55	1.2	30	9	0.11	41,610

EAGLE MOUNTAIN

Future No-Build Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1B.WK1

SAFETY ANALYSIS

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs	1995 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	NO-BUILD HAZARD INDEX
						36.47					
SEGMENT 6: COLTON YARD to LA VERNE TRANSFER STATION											
Pepper Ave.	2	12,364	10	6.4	51.6	1.57	1.8	2	8	0.2	4,946
Sycamore Ave.	2	4,327	10	5.7	16.0	0.62	2.3	2	3	0.34	2,943
Riverside Ave.	4	14,837	10	6.0	57.7	2.05	2.1	2	9	0.11	3,264
Alder Ave.	2	5,069	10	5.8	19.0	0.72	2.3	2	9	0.11	1,115
Mango Ave.	2	7,418	10	6.0	28.7	1.02	2.1	2	8	0.2	2,967
Sierra Ave.	4	15,208	10	6.0	59.4	2.10	2.1	2	8	0.2	6,083
Juniper Ave.	2	6,429	10	5.9	24.5	0.89	2.2	2	9	0.11	1,414
Milliken Ave.	2	6,182	10	5.9	23.5	0.86	2.2	2	9	0.11	1,360
Haven Ave.	2	9,149	10	6.1	36.3	1.22	2.0	2	9	0.11	2,013
Archibald Ave.	4	4,204	10	5.6	15.2	0.63	2.5	2	9	0.11	925
Base Line St.	4	9,891	10	5.8	37.1	1.42	2.3	2	9	0.11	2,176
Grove Ave.	4	10,880	10	5.8	41.1	1.55	2.3	2	9	0.11	2,394
Campus Ave.	4	5,935	10	5.7	21.7	0.88	2.4	2	3	0.34	4,036
Euclid Ave.	6	30,415	10	6.3	124.1	4.09	2.0	2	9	0.11	6,691
San Antonio Ave.	4	9,149	10	5.8	34.2	1.32	2.3	2	3	0.34	6,222
Mountain Ave.	4	16,568	10	6.1	65.3	2.27	2.1	2	9	0.11	3,645
Benson Ave.	2	4,327	10	5.7	16.0	0.62	2.3	2	1	1	8,655
Central Ave.	4	17,310	10	6.1	68.6	2.35	2.1	2	9	0.11	3,808
Towne Ave.	2	9,843	10	6.2	39.5	1.30	2.0	2	9	0.11	2,165
Garey Ave.	4	14,466	10	6.0	56.1	2.01	2.1	4	9	0.11	6,365
Pine St.	2	9,843	10	6.2	39.5	1.30	2.0	28	1	1	275,603
Fulton Rd.	2	14,466	10	6.7	62.5	1.77	1.7	8	9	0.11	12,730
White Ave.	4	11,255	10	5.9	42.6	1.60	2.3	8	9	0.11	9,904
D Street	2	6,182	10	5.9	23.5	0.86	2.2	4	1	1	24,728

EAGLE MOUNTAIN

Future No-Build Conditions

DELAY ANALYSIS

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1B.WK1

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs	1995 DELAY PER VEH. (min)	EXISTING/ NO-BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	NO-BUILD HAZARD INDEX
						35.02					
SEGMENT 7: LA VERNE TRANS. STN. to IRWINDALE TRANS. STN.											
Sunflower Ave.	2	4,505	10	5.7	16.7	0.64	2.3	4	9	0.11	1,982
Covina Blvd.	2	3,650	10	5.7	13.4	0.53	2.4	4	9	0.11	1,606
Barranca Ave.	2	9,385	10	6.2	37.4	1.25	2.0	4	8	0.2	7,508
Hollenbeck Ave.	2	7,821	10	6.0	30.4	1.06	2.1	4	8	0.2	6,256
Azusa Ave.	6	13,451	10	5.8	50.5	1.97	2.3	4	9	0.11	5,919
Irwindale Ave.	2	6,483	10	5.9	24.7	0.90	2.2	4	8	0.2	5,186
						6.35					
SEGMENT 8: IRWINDALE TRANS. STN. to INDUSTRY BRANCHPOINT											
Ramona Blvd./Downing Av.	4	15,641	20	3.4	34.1	0.67	1.2	4	9	0.11	6,882
Francisquito Ave.	4	15,641	20	3.4	34.1	0.67	1.2	4	9	0.11	6,882
						1.34					

APPENDIX E
Future Conditions Without the Project Traffic Operations Analysis Worksheets

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Eagle Mtn n/o Ragsdale
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 NO BLD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.5
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	100 / 0
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.71	.88
B	2.2	2	2.5	.92	.71	.86
C	2.2	2	2.5	.92	.71	.86
D	2	1.6	1.6	.92	.71	.88
E	2	1.6	1.6	.97	.71	.88

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 15
ACTUAL FLOW RATE: 30

LOS	SERVICE FLOW RATE	V/C
A	193	.12
B	376	.24
C	611	.39
D	995	.62
E	1692	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Desert Ctr Rice Rd
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 NO BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.85
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	.88
B	2.2	2	2.5	.92	.94	.86
C	2.2	2	2.5	.92	.94	.86
D	2	1.6	1.6	.92	.94	.88
E	2	1.6	1.6	.97	.94	.88

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 63
ACTUAL FLOW RATE: 74

LOS	SERVICE FLOW RATE	V/C
A	255	.12
B	498	.24
C	809	.39
D	1317	.62
E	2240	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Lake Tamarisk Dr
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 NO BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION....

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	.14
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.82
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	1
B	2.2	2	2.5	.92	.94	1
C	2.2	2	2.5	.92	.94	1
D	2	1.6	1.6	.92	.94	1
E	2	1.6	1.6	.97	.94	1

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 60
ACTUAL FLOW RATE: 73

LOS	SERVICE FLOW RATE	V/C
A	290	.12
B	580	.24
C	943	.39
D	1499	.62
E	2549	1

LOS FOR GIVEN CONDITIONS: A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 Eastbound

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain Road

L1NB

NAME OF THE ANALYST.............................. SDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. Daily Peak Hour

OTHER INFORMATION: 1995 NO BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	10	0	0	1
THRU	0	0	0	0
RIGHT	0	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	2	1	1	1
LANE USAGE	LT + R	LTR		

L1NB

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
WB	5.50	5.50	0.00	5.50
EB	5.50	5.50	0.00	5.50
MAJOR LEFTS				
SB	5.00	5.00	0.00	5.00
NB	5.00	5.00	0.00	5.00
MINOR THROUGHS				
WB	6.00	6.00	0.00	6.00
EB	6.00	6.00	0.00	6.00
MINOR LEFTS				
WB	6.50	6.50	0.00	6.50
EB	6.50	6.50	0.00	6.50

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	918	918 >	918 >	918 >	A
THROUGH	0	998	997 >	0 997 >	0 997 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	14	918	917 >	0 917 >	0 903 >	A
THROUGH	0	998	997 >	997 >	997 >	A
RIGHT	0	1000	1000	1000	1000	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	1	1000	1000	1000	999	A

L | NB

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET............. 30

PEAK HOUR FACTOR................................ .9

AREA POPULATION................................. 10000

NAME OF THE EAST/WEST STREET.................... I-10 Westbound

NAME OF THE NORTH/SOUTH STREET.................. Eagle Mountain

L2NB

NAME OF THE ANALYST............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy)................. 12/26/89

TIME PERIOD ANALYZED............................ DAILY PEAK HOUR

OTHER INFORMATION: 1995 NO BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	0	0
THRU	0	0	0	0
RIGHT	0	4	0	12

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	2	1	1
LANE USAGE	LTR	LT + R		

L2NB

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	1	27	0
NORTHBOUND	0	0	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
WB	5.50	5.50	0.00	5.50
EB	5.50	5.50	0.00	5.50
MAJOR LEFTS				
SB	5.00	5.00	0.00	5.00
NB	5.00	5.00	0.00	5.00
MINOR THROUGHS				
WB	6.00	6.00	0.00	6.00
EB	6.00	6.00	0.00	6.00
MINOR LEFTS				
WB	6.50	6.50	0.00	6.50
EB	6.50	6.50	0.00	6.50

L2NB

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	907	907 >	0 907 >	0 907 >	A
THROUGH	0	986	986 >	986 >	986 >	A
RIGHT	6	1000	1000	1000	994	A
MINOR STREET						
EB LEFT	0	909	906 >	906 >	906 >	A
THROUGH	0	993	993 >	0 993 >	0 993 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	0	1000	1000	1000	1000	A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... Ragsdale Road

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain

L3NB

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 NO BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	0	0	3
THRU	--	0	0	12
RIGHT	--	0	4	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	1	1	1

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	-----	---	---	-
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

L3NB

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	---	---	---
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
WB	5.50	5.50	0.00	5.50
MAJOR LEFTS				
SB	5.00	5.00	0.00	5.00
MINOR LEFTS				
WB	6.50	6.50	0.00	6.50

L3NBL

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)		SHARED CAPACITY c_{SH} (pcph)		RESERVE CAPACITY $c_R = c_{SH} - v$		LOS
MINOR STREET									
WB LEFT	0	901	899	>	899	>	899	>	A
-				>	0	>	0	>	
RIGHT	0	1000	1000	>	1000	>	1000	>	A
MAJOR STREET									
SB LEFT	4	1000	1000		1000		996		A

****

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................ .9

AREA POPULATION................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 EASTBOUND RAMPS

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

L4 NB

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 NO BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	50	0	0	26
THRU	3	0	1	0
RIGHT	3	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

L4NB

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

LANB

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	883	862 >	862 >	862 >	A
THROUGH	0	968	949 >	0 949 >	0 949 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	61	889	872 >	872 >	811 >	A
THROUGH	4	967	949 >	882 949 >	813 945 >A	A
RIGHT	4	1000	1000 >	1000 >	996 >	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	32	1000	1000	1000	968	A

****

L5NB

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................ .9

AREA POPULATION................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 WESTBOUND RAMPS

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

NAME OF THE ANALYST.............................. CDJ

DATE OF THE ANALYSIS (mm/dd/yy).................. 12/26/89

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 NO BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	1	0
THRU	0	0	43	25
RIGHT	0	21	0	29

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

LSNB

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	1	27	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

L5NB

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	811	811	> 811	> 811	> A
THROUGH	0	886	885	> 998 885	> 972 885	> A
RIGHT	26	998	998	> 998	> 972	> A
MINOR STREET						
EB LEFT	0	804	791	> 791	> 791	> A
THROUGH	0	903	902	> 0 902	> 0 902	> A
RIGHT	0	998	998	> 998	> 998	> A
MAJOR STREET						
NB LEFT	1	1000	1000	1000	999	A
SB LEFT	0	1000	1000	1000	1000	A

APPENDIX F
Future Conditions With the Project At-grade Crossing Analysis

EAGLE MOUNTAIN

DELAY ANALYSIS

Future Build Conditions

Alternative Route 1

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1C.WK1

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	BUILD HAZARD INDEX
SEGMENT 1: EAGLE MOUNTAIN TO COLTON/SAN BERN. TRNSFR. STN.											
Parkside Dr.	2	332	65	1.5	0.3	0.00	0.0	40.4	8	0.2	2,682
Bay Dr.	2	676	65	1.5	0.6	0.01	1.0	40.4	8	0.2	5,463
Cleveland St.	2	74	65	1.5	0.1	0.00	0.0	40.4	9	0.11	328
66th Ave.	2	3,848	65	1.6	3.6	0.04	0.7	40.4	9	0.11	17,099
62nd Ave.	2	602	65	1.5	0.5	0.01	1.2	40.4	9	0.11	2,677
58th Ave.	2	774	65	1.5	0.7	0.01	0.9	40.4	8	0.2	6,257
Airport Blvd.	2	5,642	65	1.6	5.4	0.05	0.6	40.4	9	0.11	25,074
52nd Ave.	2	1,217	65	1.5	1.1	0.01	0.5	39.4	9	0.11	5,274
5th St.	2	252	65	1.5	0.2	0.00	0.0	37.4	8	0.2	1,885
50th Ave.	2	1,398	65	1.5	1.3	0.01	0.5	37.4	8	0.2	10,455
Dillon Rd.	2	7,130	65	1.6	6.9	0.06	0.5	40.4	9	0.11	31,684
Monroe St.	2	9,124	30	2.6	14.9	0.21	0.8	37.4	9	0.11	37,534
Tipton	2	111	40	1.9	0.1	0.00	0.0	45.4	8	0.2	1,005
Broadway	2	1,832	40	2.0	2.2	0.03	0.8	45.4	9	0.11	9,147
Apache Trail	2	3,712	40	2.0	4.6	0.06	0.8	15.4	9	0.11	6,289
Hargrave	2	3,700	40	2.0	4.6	0.06	0.8	44.4	9	0.11	18,071
San Gorgonio	2	3,626	40	2.0	4.5	0.06	0.8	43.4	9	0.11	17,312
22nd St.	2	6,969	40	2.1	9.0	0.11	0.7	44.4	9	0.11	34,035
North Sunset	2	652	40	2.0	0.8	0.01	0.8	44.4	9	0.11	3,182
Highland Springs	2	283	40	1.9	0.3	0.00	0.0	45.4	9	0.11	1,412
Pennsylvania	2	615	50	1.7	0.6	0.01	1.0	44.4	9	0.11	3,002
Beaumont St.	2	4,179	50	1.8	4.5	0.05	0.7	44.4	9	0.11	20,413
California	2	1,414	50	1.7	1.5	0.02	0.8	44.4	9	0.11	6,904
Veile Ave.	2	492	50	1.7	0.5	0.01	1.2	44.4	8	0.2	4,366
San Timoteo Canyon Rd.	2	443	50	1.7	0.5	0.01	1.2	45.4	9	0.11	2,210
Live Oak Canyon	2	947	40	2.0	1.1	0.02	1.1	15.4	9	0.11	1,603
Alessandro Rd.	2	3,815	40	2.0	4.7	0.06	0.8	59.4	9	0.11	24,930

EAGLE MOUNTAIN

Future Build Conditions

DELAY ANALYSIS

Alternative Route 1

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1C.WK1

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	BUILD HAZARD INDEX
San Timoteo Canyon Rd.	2	5,968	40	2.1	7.6	0.09	0.7	59.4	9	0.11	38,993
Beaumont Ave.	2	958	40	2.0	1.1	0.02	1.1	59.4	9	0.11	6,259
Whittier Ave.	2	174	40	1.9	0.2	0.00	0.0	59.4	9	0.11	1,137
Hunts Ln.	2	11,780	50	2.0	14.2	0.13	0.5	59.4	9	0.11	76,972
						1.16					423,653
SEGMENT 2: KAISER SPUR TO INDUSTRY TRANSFER STATION											
Milliken Ave.	6	24,728	65	1.7	24.5	0.21	0.5	40.2	9	0.11	109,347
Vineyard Ave.	4	23,459	60	1.8	25.6	0.21	0.5	40.2	9	0.11	103,738
						0.42					213,085
SEGMENT 3: INDUSTRY TRANS. STN. TO INDUSTRY BRANCH POINT											
Nogales St.	5	29,554	60	1.8	32.3	0.26	0.5	32	9	0.11	99,767
Sunset Ave.	5	16,711	60	1.7	16.9	0.16	0.6	32	9	0.11	56,412
						0.42					156,179
SEGMENT 4: INDUSTRY BRANCH POINT TO S. PACIFIC'S L.A. YARD											
Ramona	4	32,133	30	2.9	58.9	0.65	0.7	32	9	0.11	113,108
Valley	4	20,221	25	3.0	38.5	0.59	0.9	32	9	0.11	71,178
						1.24					
SEGMENT 5: SOUTHERN PACIFIC'S L.A. YARD to N. ORANGE COUNTY											
Washington Blvd.	4	25,942	10	6.5	110.0	3.30	1.8	NA	NA	NA	ERR
Santa Fe Ave.	4	16,435	10	6.1	64.7	2.25	2.1	NA	NA	NA	ERR

EAGLE MOUNTAIN

DELAY ANALYSIS

Future Build Conditions

Alternative Route 1

SAFETY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1C.WK1

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	BUILD HAZARD INDEX
25th Street	4	4,834	10	5.6	17.5	0.72	2.5	NA	NA	NA	ERR
E. Alameda St.	2	8,594	10	6.1	33.8	1.16	2.1	NA	NA	NA	ERR
41st Street	2	10,656	10	6.3	43.3	1.39	1.9	25.2	4	0.34	91,301
Vernon Ave.	5	12,998	10	5.8	49.1	1.87	2.3	5.2	4	0.34	22,980
55th St.	2	6,649	10	5.9	25.4	0.92	2.2	29.2	4	0.34	66,014
Slauson Ave.	4	30,400	10	6.8	133.7	3.73	1.7	29.2	8	0.2	177,534
Gage Ave.	3	18,369	20	3.7	42.8	0.73	1.0	29.2	8	0.2	107,273
Florence Ave.	6	28,262	20	3.5	63.6	1.19	1.1	29.2	8	0.2	165,050
Nadeau St.	5	13,427	20	3.3	28.3	0.60	1.3	29.2	9	0.11	43,129
Santa Fe Ave.	4	9,560	15	4.1	25.2	0.68	1.6	21.2	9	0.11	22,295
Long Beach Blvd.	4	19,658	15	4.4	56.0	1.31	1.4	21.2	9	0.11	45,842
State St.	4	12,890	20	3.4	27.5	0.56	1.2	11.2	9	0.11	15,881
Otis Ave.	4	12,890	20	3.4	27.5	0.56	1.2	31.2	9	0.11	44,240
Atlantic Ave.	6	26,855	20	3.5	60.0	1.14	1.1	11.2	9	0.11	33,085
Garfield Ave.	6	25,888	20	3.5	57.5	1.11	1.2	11.2	9	0.11	31,894
Firestone Blvd.	8	46,298	20	3.7	108.1	1.91	1.1	7.2	9	0.11	36,668
Paramount Blvd.	6	26,533	20	3.5	59.2	1.13	1.1	11.2	9	0.11	32,688
Lakewood Blvd.	6	36,523	20	3.7	85.8	1.48	1.0	11.2	9	0.11	44,996
Woodruff Ave.	4	15,039	20	3.4	32.7	0.65	1.2	5.2	9	0.11	8,602
Studebaker Rd.	4	13,127	20	3.4	28.1	0.57	1.2	7.2	8	0.2	18,902
Pioneer Blvd.	4	16,059	20	3.5	35.1	0.68	1.2	7.2	9	0.11	12,719
San Antonio Blvd.	4	18,906	20	3.5	42.2	0.79	1.1	3.2	9	0.11	6,655
Rosecrans Ave.	6	30,077	20	3.6	68.3	1.26	1.1	7.2	9	0.11	23,821
Artesia Blvd.	6	27,175	20	3.5	60.8	1.16	1.1	13.2	9	0.11	39,458
Knott Ave.	4	21,740	20	3.6	49.6	0.89	1.1	13.2	9	0.11	31,566
Western Ave.	4	16,305	20	3.5	35.7	0.69	1.2	13.2	9	0.11	23,675
Beach Blvd.	6	36,958	20	3.7	87.0	1.49	1.0	31.2	9	0.11	126,839
Stanton Ave.	4	12,609	20	3.4	26.9	0.55	1.2	31.2	9	0.11	43,275

EAGLE MOUNTAIN

Future Build Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1C.WK1

Alternative Route 1

SAFETY ANALYSIS

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	BUILD HAZARD INDEX
						36.47					
SEGMENT 6: COLTON YARD to LA VERNE TRANSFER STATION											
Pepper Ave.	2	12,364	10	6.4	51.6	1.57	1.8	5	8	0.2	12,364
Sycamore Ave.	2	4,327	10	5.7	16.0	0.62	2.3	5	3	0.34	7,357
Riverside Ave.	4	14,837	10	6.0	57.7	2.05	2.1	5	9	0.11	8,160
Alder Ave.	2	5,069	10	5.8	19.0	0.72	2.3	5	9	0.11	2,788
Mango Ave.	2	7,418	10	6.0	28.7	1.02	2.1	5	8	0.2	7,418
Sierra Ave.	4	15,208	10	6.0	59.4	2.10	2.1	5	8	0.2	15,208
Juniper Ave.	2	6,429	10	5.9	24.5	0.89	2.2	5	9	0.11	3,536
Milliken Ave.	2	6,182	10	5.9	23.5	0.86	2.2	5	9	0.11	3,400
Haven Ave.	2	9,149	10	6.1	36.3	1.22	2.0	5	9	0.11	5,032
Archibald Ave.	4	4,204	10	5.6	15.2	0.63	2.5	5	9	0.11	2,312
Base Line St.	4	9,891	10	5.8	37.1	1.42	2.3	5	9	0.11	5,440
Grove Ave.	4	10,880	10	5.8	41.1	1.55	2.3	5	9	0.11	5,984
Campus Ave.	4	5,935	10	5.7	21.7	0.88	2.4	5	3	0.34	10,089
Euclid Ave.	6	30,415	10	6.3	124.1	4.09	2.0	5	9	0.11	16,728
San Antonio Ave.	4	9,149	10	5.8	34.2	1.32	2.3	5	3	0.34	15,554
Mountain Ave.	4	16,568	10	6.1	65.3	2.27	2.1	5	9	0.11	9,112
Benson Ave.	2	4,327	10	5.7	16.0	0.62	2.3	5	1	1	21,637
Central Ave.	4	17,310	10	6.1	68.6	2.35	2.1	5	9	0.11	9,520
Towne Ave.	2	9,843	10	6.2	39.5	1.30	2.0	5	9	0.11	5,414
Garey Ave.	4	14,466	10	6.0	56.1	2.01	2.1	7	9	0.11	11,139
Pine St.	2	9,843	10	6.2	39.5	1.30	2.0	31	1	1	305,132
Fulton Rd.	2	14,466	10	6.7	62.5	1.77	1.7	11	9	0.11	17,504
White Ave.	4	11,255	10	5.9	42.6	1.60	2.3	11	9	0.11	13,618
D Street	2	6,182	10	5.9	23.5	0.86	2.2	7	1	1	43,274

EAGLE MOUNTAIN

Future Build Conditions

DELAY ANALYSIS

P89246x0

25-Jan-90

File: RAIL1C.WK1

Alternative Route 1

SAFETY ANALYSIS

STREET NAME	LANES	1995 ADT	TRAIN SPEED (mph)	1995 ELAPSED TIME (min)	1995 TOTAL VEH. DELAYED (veh)	1995 TOTAL DELAY TIME (veh-hrs)	1995 DELAY PER VEH. (min)	BUILD DAILY NUMBER OF TRAINS	TYPE OF PRO-TEC-TION	RELATIVE HAZARD (Pf)	BUILD HAZARD INDEX

						35.02					
SEGMENT 7: LA VERNE TRANS. STN. to IRWINDALE TRANS. STN.											
Sunflower Ave.	2	4,505	10	5.7	16.7	0.64	2.3	5.8	9	0.11	2,874
Covina Blvd.	2	3,650	10	5.7	13.4	0.53	2.4	5.8	9	0.11	2,328
Barranca Ave.	2	9,385	10	6.2	37.4	1.25	2.0	5.8	8	0.2	10,886
Hollenbeck Ave.	2	7,821	10	6.0	30.4	1.06	2.1	5.8	8	0.2	9,072
Azusa Ave.	6	13,451	10	5.8	50.5	1.97	2.3	5.8	9	0.11	8,582
Irwindale Ave.	2	6,483	10	5.9	24.7	0.90	2.2	5.8	8	0.2	7,520

						6.35					
SEGMENT 8: IRWINDALE TRANS. STN. to INDUSTRY BRANCHPOINT											
Ramona Blvd./Downing Av.	4	15,641	20	3.4	34.1	0.67	1.2	4	9	0.11	6,882
Francisquito Ave.	4	15,641	20	3.4	34.1	0.67	1.2	4	9	0.11	6,882

						1.34					

APPENDIX G
Future Conditions With the Project
Traffic Operations Analysis Worksheets

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Desert Ctr Rice Rd
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION.... FILE: S3BLDA

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	.05
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.83
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	1
B	2.2	2	2.5	.92	.94	1
C	2.2	2	2.5	.92	.94	1
D	2	1.6	1.6	.92	.94	1
E	2	1.6	1.6	.97	.94	1

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 179
ACTUAL FLOW RATE: 216

LOS	SERVICE FLOW RATE	V/C
A	290	.12
B	581	.24
C	944	.39
D	1501	.62
E	2552	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Kaiser Rd n/o Lake Tamarisk Dr
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION.... FILE: S4BLDA

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	.05
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.83
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	1
B	2.2	2	2.5	.92	.94	1
C	2.2	2	2.5	.92	.94	1
D	2	1.6	1.6	.92	.94	1
E	2	1.6	1.6	.97	.94	1

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 176
ACTUAL FLOW RATE: 212

LOS	SERVICE FLOW RATE	V/C
A	290	.12
B	581	.24
C	944	.39
D	1501	.62
E	2552	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Eagle Mtn n/o Ragsdale
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION.... FILE: S1BLDA

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS.........................	70
PERCENTAGE OF BUSES..........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	0
DESIGN SPEED (MPH)...........................	60
PEAK HOUR FACTOR.............................	.61
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT)..............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES.....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	.59
B	2.2	2	2.5	.92	.94	.54
C	2.2	2	2.5	.92	.94	.54
D	2	1.6	1.6	.92	.94	.59
E	2	1.6	1.6	.97	.94	.59

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 44
ACTUAL FLOW RATE: 72

LOS	SERVICE FLOW RATE	V/C
A	171	.12
B	316	.24
C	513	.39
D	883	.62
E	1502	1

LOS FOR GIVEN CONDITIONS: A

1985 HCM:TWO-LANE HIGHWAYS
****

FACILITY LOCATION.... Eagle Mtn n/o Aqueduct
ANALYST.............. cdw
TIME OF ANALYSIS..... 1995 BUILD
DATE OF ANALYSIS..... 7/13/90
OTHER INFORMATION.... FILE: S2BLDA

A) ADJUSTMENT FACTORS

PERCENTAGE OF TRUCKS........................	99
PERCENTAGE OF BUSES.........................	0
PERCENTAGE OF RECREATIONAL VEHICLES.........	1
DESIGN SPEED (MPH)..........................	60
PEAK HOUR FACTOR............................	.83
DIRECTIONAL DISTRIBUTION (UP/DOWN)..........	60 / 40
LANE WIDTH (FT).............................	12
USABLE SHOULDER WIDTH (AVG. WIDTH IN FT.)...	4
PERCENT NO PASSING ZONES....................	20

B) CORRECTION FACTORS

LEVEL TERRAIN

LOS	E_T	E_B	E_R	f_w	f_d	f_{HV}
A	2	1.8	2.2	.92	.94	.5
B	2.2	2	2.5	.92	.94	.45
C	2.2	2	2.5	.92	.94	.45
D	2	1.6	1.6	.92	.94	.5
E	2	1.6	1.6	.97	.94	.5

C) LEVEL OF SERVICE RESULTS

INPUT VOLUME(vph): 29
ACTUAL FLOW RATE: 35

LOS	SERVICE FLOW RATE	V/C
A	145	.12
B	264	.24
C	429	.39
D	752	.62
E	1279	1

LOS FOR GIVEN CONDITIONS: A

****

IDENTIFYING INFORMATION L1BLD

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 Eastbound

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain Road

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 2/26/90

TIME PERIOD ANALYZED............................. Daily Peak Hour

OTHER INFORMATION: 1995 BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	25	0	0	2
THRU	0	0	0	0
RIGHT	0	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	2	1	1	1
LANE USAGE	LT + R	LTR		

L1BLD

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

L1BLD

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	917	916 >	916 >	916 >	A
THROUGH	0	997	996 >	0 996 >	0 996 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	31	917	915 >	0 915 >	0 885 >	A
THROUGH	0	997	995 >	995 >	995 >	A
RIGHT	0	1000	1000	1000	1000	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	2	1000	1000	1000	998	A

##

IDENTIFYING INFORMATION LZ BLD

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 Westbound

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 2/26/90

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	0	0
THRU	0	0	15	1
RIGHT	0	5	0	27

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	2	1	1
LANE USAGE	LTR	LT + R		

L2BLD

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	0	0	0
WESTBOUND	1	27	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

L2BLD

MOVEMENT	FLOW-RATE v(pcph)	POTENTIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	872	872 >	0 872 >	0 872 >	A
THROUGH	0	950	950 >	950 >	950 >	A
RIGHT	7	999	999	999	992	A
MINOR STREET						
EB LEFT	0	882	878 >	878 >	878 >	A
THROUGH	0	966	966 >	0 966 >	0 966 >	A
RIGHT	0	999	999 >	999 >	999 >	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	0	1000	1000	1000	1000	A

IDENTIFYING INFORMATION L3BLP

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... Ragsdale Road

NAME OF THE NORTH/SOUTH STREET................... Eagle Mountain

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 2/26/90

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: T-INTERSECTION

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	--	0	0	3
THRU	--	0	13	28
RIGHT	--	0	4	0

NUMBER OF LANES

	EB	WB	NB	SB
LANES	--	1	1	1

L3BLD

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	—	—	—	-
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	—	—	—
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
WB	5.50	5.50	0.00	5.50
MAJOR LEFTS				
SB	5.00	5.00	0.00	5.00
MINOR LEFTS				
WB	6.50	6.50	0.00	6.50

LSBLD

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	1	27	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

	TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS				
WB	5.50	5.50	0.00	5.50
EB	5.50	5.50	0.00	5.50
MAJOR LEFTS				
SB	5.00	5.00	0.00	5.00
NB	5.00	5.00	0.00	5.00
MINOR THROUGHS				
WB	6.00	6.00	0.00	6.00
EB	6.00	6.00	0.00	6.00
MINOR LEFTS				
WB	6.50	6.50	0.00	6.50
EB	6.50	6.50	0.00	6.50

****

L5BLD

IDENTIFYING INFORMATION

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 WESTBOUND RAMPS

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 2/26/90

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	0	0	1	0
THRU	0	0	73	33
RIGHT	0	25	0	98

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

L4BLD

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_p (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	874	848 >	848 >	848 >	A
THROUGH	0	959	935 >	0 935 >	0 935 >	A
RIGHT	0	1000	1000 >	1000 >	1000 >	A
MINOR STREET						
EB LEFT	98	880	858 >	858 >	760 >	A
THROUGH	4	958	934 >	865 934 >	760 930 >A	A
RIGHT	4	1000	1000 >	1000 >	996 >	A
MAJOR STREET						
NB LEFT	0	1000	1000	1000	1000	A
SB LEFT	42	1000	1000	1000	958	A

L4BLD

	PERCENT GRADE	RIGHT TURN ANGLE	CURB RADIUS (ft) FOR RIGHT TURNS	ACCELERATION LANE FOR RIGHT TURNS
EASTBOUND	0.00	90	20	N
WESTBOUND	0.00	90	20	N
NORTHBOUND	0.00	90	20	N
SOUTHBOUND	0.00	90	20	N

VEHICLE COMPOSITION

	% SU TRUCKS AND RV'S	% COMBINATION VEHICLES	% MOTORCYCLES
EASTBOUND	1	27	0
WESTBOUND	0	0	0
NORTHBOUND	1	27	0
SOUTHBOUND	1	27	0

CRITICAL GAPS

		TABULAR VALUES (Table 10-2)	ADJUSTED VALUE	SIGHT DIST. ADJUSTMENT	FINAL CRITICAL GAP
MINOR RIGHTS					
	WB	5.50	5.50	0.00	5.50
	EB	5.50	5.50	0.00	5.50
MAJOR LEFTS					
	SB	5.00	5.00	0.00	5.00
	NB	5.00	5.00	0.00	5.00
MINOR THROUGHS					
	WB	6.00	6.00	0.00	6.00
	EB	6.00	6.00	0.00	6.00
MINOR LEFTS					
	WB	6.50	6.50	0.00	6.50
	EB	6.50	6.50	0.00	6.50

##

IDENTIFYING INFORMATION L4BLD

AVERAGE RUNNING SPEED, MAJOR STREET.............. 30

PEAK HOUR FACTOR................................. .9

AREA POPULATION.................................. 10000

NAME OF THE EAST/WEST STREET..................... I-10 EASTBOUND RAMPS

NAME OF THE NORTH/SOUTH STREET...................
DESERT CENTER RICE ROAD

NAME OF THE ANALYST.............................. CDW

DATE OF THE ANALYSIS (mm/dd/yy).................. 2/26/90

TIME PERIOD ANALYZED............................. DAILY PEAK HOUR

OTHER INFORMATION: 1995 BUILD CONDITIONS

INTERSECTION TYPE AND CONTROL

INTERSECTION TYPE: 4-LEG

MAJOR STREET DIRECTION: NORTH/SOUTH

CONTROL TYPE EASTBOUND: STOP SIGN

CONTROL TYPE WESTBOUND: STOP SIGN

TRAFFIC VOLUMES

	EB	WB	NB	SB
LEFT	80	0	0	34
THRU	3	0	1	0
RIGHT	3	0	1	0

NUMBER OF LANES AND LANE USAGE

	EB	WB	NB	SB
LANES	1	1	1	1
LANE USAGE	LTR	LTR		

L3BLP

MOVEMENT	FLOW-RATE v(pcph)	POTEN-TIAL CAPACITY c_P (pcph)	ACTUAL MOVEMENT CAPACITY c_M (pcph)	SHARED CAPACITY c_{SH} (pcph)	RESERVE CAPACITY $c_R = c_{SH} - v$	LOS
MINOR STREET						
WB LEFT	0	869	867 >	867 >	867 >	A
			>	0 >	0	>E
RIGHT	0	999	999 >	999 >	999 >	A
MAJOR STREET						
SB LEFT	4	1000	1000	1000	996	A

Bureau of Land Management

Planning Department

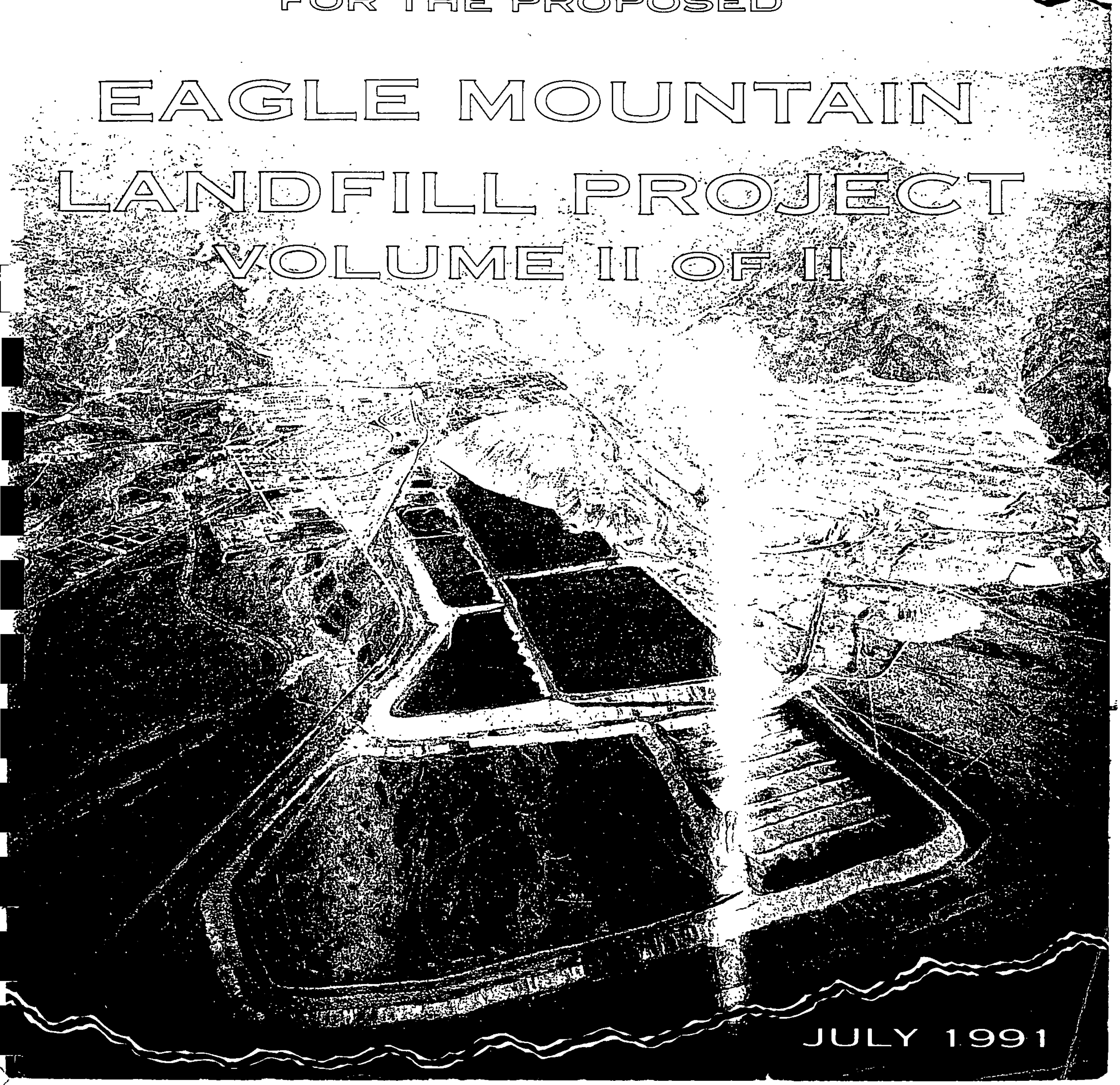
4726
v.2

APPENDIXES
TO THE
DRAFT
ENVIRONMENTAL IMPACT STATEMENT
ENVIRONMENTAL IMPACT REPORT

FOR THE PROPOSED

EAGLE MOUNTAIN LANDFILL PROJECT

VOLUME II OF II



JULY 1991

Appendixes to the Draft Environmental Impact Statement/ Environmental Impact Report for the Eagle Mountain Landfill Project (Volume II of II)

Prepared for

MINE RECLAMATION CORPORATION
3179 TEMPLE AVENUE, SUITE 290
POMONA, CA 91768

Prepared by

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON Number 2100E
June 18, 1991

This document printed on recycled paper.

Appendixes Volume II

APPENDIX E

sierra research

Air Quality Impacts of Proposed Eagle Mountain Project

August 22, 1990

prepared by:

Sierra Research, Inc.
1521 I Street
Sacramento, California 95814
(916) 444-6666

AIR QUALITY IMPACTS OF PROPOSED
EAGLE MOUNTAIN PROJECT

SIERRA RESEARCH, INC
1521 I Street
Sacramento, CA 95814
(916) 444-6666

TABLE OF CONTENTS

List of Tables

List of Figures

PART I. ENVIRONMENTAL SETTING

1. GEOGRAPHY/TOPOGRAPHY

A. South Coast Air Basin

The South Coast Air Basin (SCAB) consists of all of Orange County, and the metropolitan areas of Los Angeles, San Bernardino, and Riverside Counties. It is bounded on the northwest by Ventura County and on the south by San Diego County. The northern boundary runs roughly along the Angeles National Forest line north of the crest of the San Gabriel and San Bernardino Mountains. The eastern border runs north-south through the San Bernardino and San Jacinto mountains, although the Banning Pass area is excluded from the Air Basin. The remaining boundary line is the entire shoreline of Los Angeles and Orange Counties.

Within the rim of high mountains that rise to altitudes greater than 11,000 feet, the basin is a coastal plain with connecting broad valleys and low hills. On most days, the net wind flow is from west to east, which produces the effect of having air pollution source areas near the coast impacting receptor areas inland to the east. This source-receptor relationship is compounded by the population distribution in the basin. The highest population, the greatest population density, and the majority of industries, commerce, and streets and freeways are located in the principal source areas in the western portion of the basin.

B. Southeast Desert Air Basin

The Southeast Desert Air Basin (SEDAB) is composed of the eastern part of San Bernardino, Riverside, Kern, Los Angeles and San Diego Counties, and all of Imperial County, covering a total area of 33,636 square miles. It is separated from the coastal regions by mountain ranges, which also provide a climatological boundary. Elevations within the basin range from 235 feet below sea level at the Salton Sea, to 11,485 feet at the summit of Mt. San Gorgonio. The basin is naturally divided into two distinct parts: the High Desert (Mojave) and the Low Desert (Colorado).

High Desert (Mojave)

In the northern part of the Southeast Desert Air Basin lies the Mojave Desert, which gradually merges into the Great Basin without a distinct transition. This region is sheltered from maritime weather influences by mountain barriers extending from north to south. The southern end of the Sierra Nevada and the Tehachapi Mountains form a border on the northwest. To the southwest, the Sawmill, Liebre, and Sierra Pelona Mountains merge with the San Gabriel and San Bernardino Mountains to the south. Entry points into the Mojave where inter-basin transport takes place include Tehachapi Pass, Soledad Canyon, Cajon Pass, Morongo Valley, and Yucca Valley.

Low Desert (Colorado)

The Imperial and Coachella Valleys constitute the major portion of the southern part of the SEDAB. These valleys form a great depression of roughly V-shaped ground plane. This immense structural trough has its apex to the north not far from where the San Jacinto and San Bernardino Mountains meet at San Gorgonio Pass. The trough opens to the southeast, where it is continuous with the larger and much deeper depression occupied by the Gulf of Lower California. Rising more or less abruptly from the southwestern and northwestern sides of the Imperial and Coachella Valleys are bold mountains that restrict inter-basin transport of air pollution and marine air. The Peninsular Ranges border the southwestern margin, while the southeastern portion of the San Bernardino Mountains and various elevated blocks belonging to the Mojave Desert Province, lie along the northeastern side. The Salton Basin lies in the southeasternmost section of the Imperial-Coachella Trough and although now separated, it is continuous with the depression under the Gulf of Lower California. The San Gorgonio Pass has a maximum elevation of about 2,500 feet and represents a passageway between the interior and coastal portions of southern California.

2. METEOROLOGY

A. South Coast Air Basin

The South Coast Air Basin lies within the semi-permanent high pressure zone of the eastern Pacific Ocean. Typical of coastal strips along the western shores of continents at lower latitudes, the region is characterized by warm, dry summers and mild winters of moderate rainfall.

The climate of the area is characterized by warm, dry summers and mild winters. The warmest month is August, with average temperatures in the low 70s. January is the coldest month, with minimum temperatures averaging in the low 40s. Summertime maximum temperatures range from about 75°F at the coast to the 90s in inland locations. Winter lows range from the 30s at inland and mountain locations to the mid-40s near the coast.

Precipitation in the basin is associated with winter storms that migrate inland from the Pacific Ocean. Nearly 90 percent of the annual rainfall in the basin occurs during the period from November to April. Precipitation patterns show a strong orographic influence. The annual average rainfall is 11 to 15 inches in the coastal plain and inland valleys, up to 21 inches in the foothills, and greater than 50 inches in the mountains.

During the dry season, and to a lesser degree during the winter, the daily circulation pattern in the basin is typified by a daytime sea breeze blowing onshore and a nighttime land breeze moving offshore. Generally, the sea breeze is about twice as strong as the land breeze, and summer wind speeds average slightly higher than winter wind speeds. Throughout the year during the night, a drainage flow exists as cool air from the nearby mountain slopes drains down and back toward the ocean.

On occasion during the fall and winter months, a high pressure system develops over Nevada and Utah and pushes air southward over the San Gabriel and San Bernardino mountains. The resulting wind is known as a Santa Ana wind. Santa Ana winds can be very strong, with wind speeds through the mountain passes sometimes exceeding 60 mph (SCAQMD 1980), and are usually warm and dry. They tend to clear the basin of accumulated air pollutants, but can also cause dust storms and high particulate levels.

Air in the South Coast basin is generally moist, due to the presence of a marine air layer. Relative humidity during the summer usually ranges from 70 to 80 percent during the night, and 50 to 60 percent in the daytime. During winter, daytime relative humidity is usually between 50 and 60 percent, while nighttime relative humidity is approximately 50 percent.

The vertical dispersion of air pollutants in the South Coast Air Basin is limited by the presence of a persistent temperature inversion (a temperature increase with altitude) in the lower atmosphere. For that reason, the base of the inversion is called the "mixing height" of the atmosphere. Usually, inversions are lower before sunrise than during the daylight hours. The mixing height normally increases during the day as the base of the inversion erodes because of surface heating.

Along the coast of southern California, relatively cool surface air temperatures, coupled with warm, dry, subsiding air from aloft, produce inversions about 87 percent of the time in the early morning. The average occurrence of ground-based inversions is 11 days per month, and ranges from two days in June to 22 days in December and January. High inversions, with heights less than 2,500 feet above sea level (ASL), occur 22 days each month. Mixing heights of 3,500 feet ASL or less occur about 191 days each year (SCAQMD).

B. Southeast Desert Air Basin

The Southeast Desert Air Basin includes the hottest and driest parts of California, with a climate characterized by hot, dry summers and relatively mild winters. Rainfall is scant in all seasons, so differences between the seasons are marked principally by differences in temperature and not by substantial rainfall during any season. Average annual precipitation in the basin is in the range of 2 to 6 inches per year, except at high-altitude locations.

Seasonal temperature differences in the basin are large, confirming the absence of marine influences and the location of the basin. Average monthly high temperatures in the Southeast Desert Air Basin range from 108°F in July to 57°F in January. Average monthly low temperatures range from about 40°F in January to about 80°F in July. Diurnal temperature ranges are also typical of continental locations, with values of 20° to 30° in January, and 30° to 40° in July.

During much of the winter, the Southeast Desert Air Basin is covered by a moderately intense anticyclonic circulation, except during periods of frontal activity. The Pacific High retreats to the south, so that frontal systems from the North Pacific can move onto the California coast. On average, 20 to 30 frontal systems move into the northern part of the basin each winter. The first front usually arrives around the middle of October, and the average period of frontal activity is five to six months. Most of these systems are relatively weak by the time they reach the basin, however, and they become more diffuse as they move southward.

Most of the precipitation received in the Southeast Desert Air Basin is associated with this winter frontal activity, the amount varying from site to site due to the influence of altitude and mountain ranges.

The basin is protected by distance and intervening mountain ranges from the cold air masses that move southward from Canada over the Great Plains. This protection, together with the relatively low latitude, results in very infrequent occurrence of sub-zero temperatures.

Spring is a transition season between the winter period of frontal activity and the generally dry summer; some precipitation continues during the early part of the season.

During the summer, the Pacific High is well developed to the west of California, and a thermal trough overlies the SEDAB. The intensity and orientation of the trough varies from day to day. Although the rugged mountainous country prevents a normal circulation, the influence of the trough does permit some inter-basin exchange with coastal locations through the passes.

The relative humidity in summer is very low, averaging 30 to 50% in the early morning and 10 to 20% during the late afternoon. During the hottest part of the day, humidities below 10% are common. These conditions promote intense heating during the day in summer and marked cooling at night, and the intense solar radiation is highly conducive to the formation of photochemical smog.

Fall is the transition period from the hot summer back to the season of frontal activity, but it is still very dry and temperatures are still mild.

Desert regions tend to be windy, since little friction is generated between the moving air and the low, sparse vegetation cover. In addition, the rapid daytime heating of the lower air over the desert leads to convective activity. This exchange of lower and upper air tends to accelerate surface winds during the warm part of the day when convection is at a maximum. During winter, however, the rapid cooling in the surface layers at night retards this exchange of momentum, and the result is often a high frequency of calm winds. An extreme example of this is found at Edwards AFB, where calm prevails 28.8% of the time during the winter.[1*]

During all seasons, the prevailing wind direction is predominantly from the south and west. At specific sites, the prevailing winds can be modified somewhat by the effect of orographic flows, i.e., upslope in daytime and downslope at night. Only during the winter at Victorville and summer at El Centro does the wind have a significant easterly component. This southeasterly flow into the Imperial Valley presents a possible entry point of pollutants from more populated areas of nearby Mexico.

The mixing depth, i.e., the height available for dispersion of airborne pollutants emitted near the surface, is limited by the occurrence of temperature inversions. A temperature inversion is a layer of air in which the temperature increases with height. Thus, knowledge of the frequency and height of temperature inversions in the basin provides insight into the dispersion potential of the atmosphere.

The temperature inversion conditions of the SEDAB are quite different from those of the coastal regions of California. When a subsidence inversion exists over the basin, the height of the inversion base lies some 6,000 to 8,000 feet above the surface. There is a low frequency of elevated inversions in all seasons. Nighttime surface inversions in the desert are common, however, occurring with high frequency in all seasons (ARB 1975). Mixing heights are predominantly 1000 feet or less. These inversions are caused by nighttime radiational cooling of the land surface in contact with overlying air that cools more slowly. They tend to be destroyed early in the day in summer, due to intense solar radiation and heating of the land surface, and the great mixing heights result in rapid dilution of pollutants.

In winter, however, they tend to persist throughout much of the day, limiting mixing in the lower atmosphere to heights of 200 to 2,000 feet above the surface.

3. EXISTING AIR QUALITY - OVERVIEW

The federal Clean Air Act provides that national ambient air quality standards (NAAQS) can be exceeded no more than once each year. The U.S. Environmental Protection Agency has set standards for sulfur

---

* Superscripts denote references listed at the end of the report.

dioxide, nitrogen dioxide, carbon monoxide, 10-micron particulate matter (PM10), lead, and ozone. An area where a National Ambient Air Quality Standard is exceeded twice or more during a year can be considered a "non-attainment area" subject to more stringent planning and pollution control requirements. Once an area has been declared to be in non-attainment for a pollutant, it must show twelve consecutive calendar quarters with no violation of the National Ambient Air Quality Standard for that pollutant in order to be re-designated as an "attainment" area.

State of California ambient air quality standards are set by the state Air Resources Board (ARB) to protect public health and welfare. Standards have been set for sulfur dioxide, nitrogen dioxide, carbon monoxide, 10-micron particulate matter, lead, sulfates, hydrogen sulfide, vinyl chloride, and ozone, at levels designed to protect the most sensitive portions of the population, particularly children, the elderly, and people who suffer from lung or heart diseases. ARB performs program oversight activities, while primary air quality planning and enforcement activities are carried out by local air pollution control districts.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. The concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and occasionally damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short period of time (one hour, for instance), or to a relatively lower average concentration over a much longer period (one month or one year). For some pollutants there are more than one air quality standard, which reflect both its short-term and long-term effects.

Table 1 presents the state and national ambient air quality standards for selected pollutants.

Table 1

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1 hour	0.09 ppm	0.12 ppm
Carbon Monoxide	8 hour	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	-	100 $\mu g/m^3$ (0.053 ppm)
	1 hour	0.25 ppm	-
Sulfur Dioxide	Annual Average	-	80 $\mu g/m^3$ (0.03 ppm)
	24 hour	0.05 ppm (131 $\mu g/m^3$)	365 $\mu g/m^3$ (0.14 ppm)
	3 hour	-	1300 $\mu g/m^3$ * (0.5 ppm)
	1 hour	0.25 ppm	-
Suspended Particulate Matter (10 micron)	Annual Geometric Mean	30 $\mu g/m^3$	-
	24 hour	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Arithmetic Mean	-	50 $\mu g/m^3$
Sulfates	24 hour	25 $\mu g/m^3$	-

* Secondary Standard

4. CRITERIA POLLUTANTS - AIR QUALITY TRENDS

A. Ozone

South Coast Air Basin

Ozone (O_3) is an end product of complex reactions between reactive organic gases - ROG (or non-methane hydrocarbons - NMHC) and NOx in the presence of intense ultraviolet radiation. ROG and NOx emissions from millions of vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. Maximum ozone concentrations in the SCAB usually are recorded during the summer months.

Table 2 shows the California and federal air quality standards for ozone, and maximum levels recorded in the SCAB in the period 1984-1988. The data show that state ozone air quality standard is exceeded over half the days in the year.

Figures 1 and 2 show, respectively, the long-term trend of the maximum 1-hour ozone concentrations and of violations of ozone air quality standards in the SCAB. Peak ozone levels have slowly but steadily declined in the South Coast Air Basin over the last ten years, despite significant population growth in the region. However, the frequency of violations has remained relatively constant over the last several years after a substantial drop in the late 1970's and early 1980's. The Basin is a nonattainment area for ozone for purposes of state and federal air quality planning.

Southeast Desert Air Basin

Ozone (O_3) is a problematic air contaminant in the Southeast Desert Air Basin. The bulk of the ozone (and ozone precursors) in the basin comes from the heavily populated South Coast basin to the west. ROG and NOx emissions from millions of vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. Maximum ozone concentrations in both the South Coast basin and the SEDAB usually are recorded during the summer months. In the SEDAB, maximum ozone concentrations historically have been measured at the Banning (in San Gorgonio Pass) and Hesperia (near Cajon Pass) monitoring stations. Both of these stations are close to the SEDAB boundary with the South Coast basin, where readings would be expected to be higher than in other areas in the SEDAB.

Table 2

Ozone Levels in South Coast Air Basin

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.09 ppm (1-hour average)

Federal: 0.12 ppm (1-hour average)

	1984	1985	1986	1987	1988
Highest 1-hour average	.34	.39	.35	.33	.35
No. of days exceeding					
State standard	209	218	217	196	216
Federal standard	175	174	164	162	178

Source: California Air Quality Data, Annual Summary, California Air Resources Board

Figure 1

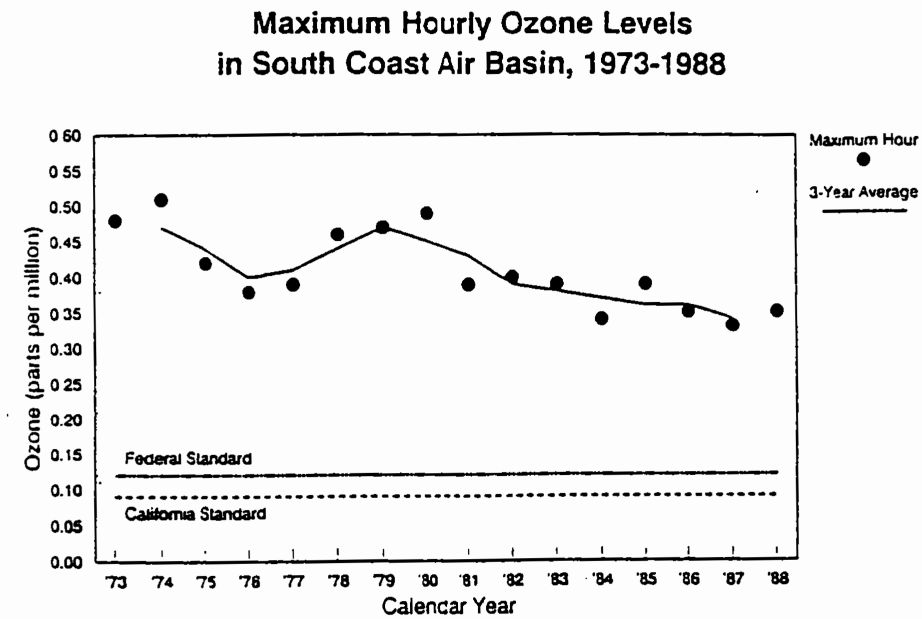


Figure 2

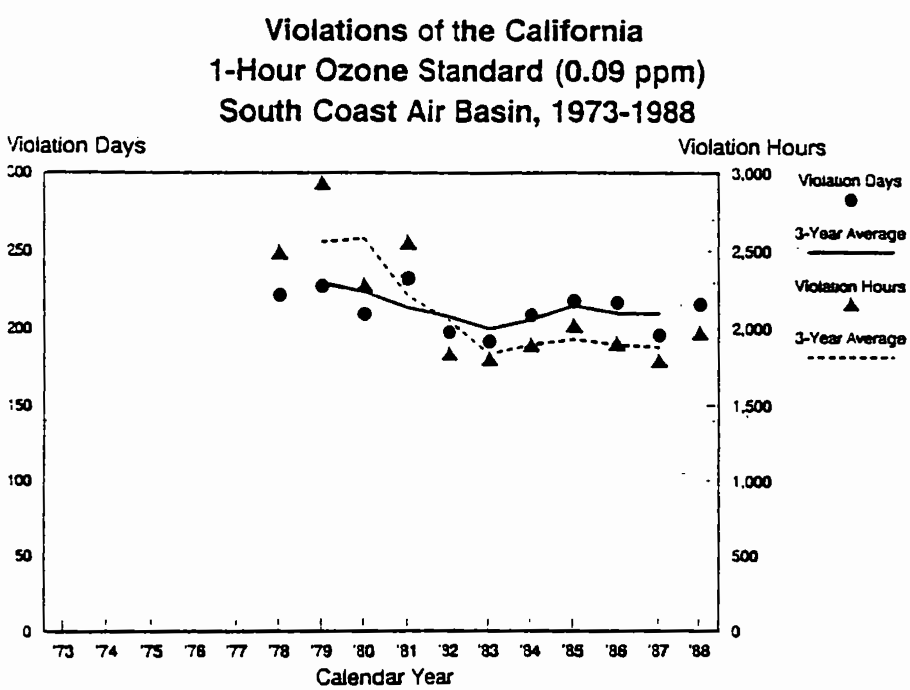


Table 3 shows the California and federal air quality standards for ozone, and maximum levels recorded in the SEDAB in the period 1984-1988. The data show that state and federal ozone air quality standards are exceeded in roughly one third to one half the days in the year.

Figures 3 and 4 show, respectively, the long-term trend of the maximum 1-hour ozone concentrations and of violations of ozone air quality standards in the SEDAB. While the maximum hourly concentrations have stayed relatively constant since 1973, in the range of 0.25 ppm, the number of days and hours each year when the standard is violated is on an upward trend since 1983. The basin is a non-attainment area for ozone under the state standards. Under the federal standards, all areas in the basin, with the exception of the Victorville area in San Bernardino County, are unclassified or attainment for ozone.

B. Nitrogen Dioxide

South Coast Air Basin

Nitrogen dioxide (NO_2) is formed primarily in the atmosphere from a reaction between nitric oxide (NO) and oxygen or ozone. Nitric oxide is formed during high temperature combustion processes when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes under certain conditions.

Table 4 shows the state and federal air quality standards for NO_2, plus the maximum levels recorded in the SCAB in the period 1984-1988.

Figure 5 shows the trend of maximum 1-hour NO_2 levels in the Basin, while violation days are plotted in Figure 6. The data show that a long, steady decline in NO_2 levels appears to have ended in the late 1980's. The Basin is a nonattainment area for NO_2 for purposes of state and federal air quality planning.

Table 3

Ozone Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.09 ppm (1-hour average)

Federal: 0.12 ppm (1-hour average)

	1984	1985	1986	1987	1988
Highest 1-hour average	.25	.29	.26	.22	.27
No. of days exceeding					
State standard	159	159	161	166	188
Federal standard	92	111	115	101	124

Source: California Air Quality Data, Annual Summary, California Air Resources Board

Figure 3

Maximum Hourly Ozone Levels in Southeast Desert Air Basin, 1973-1988

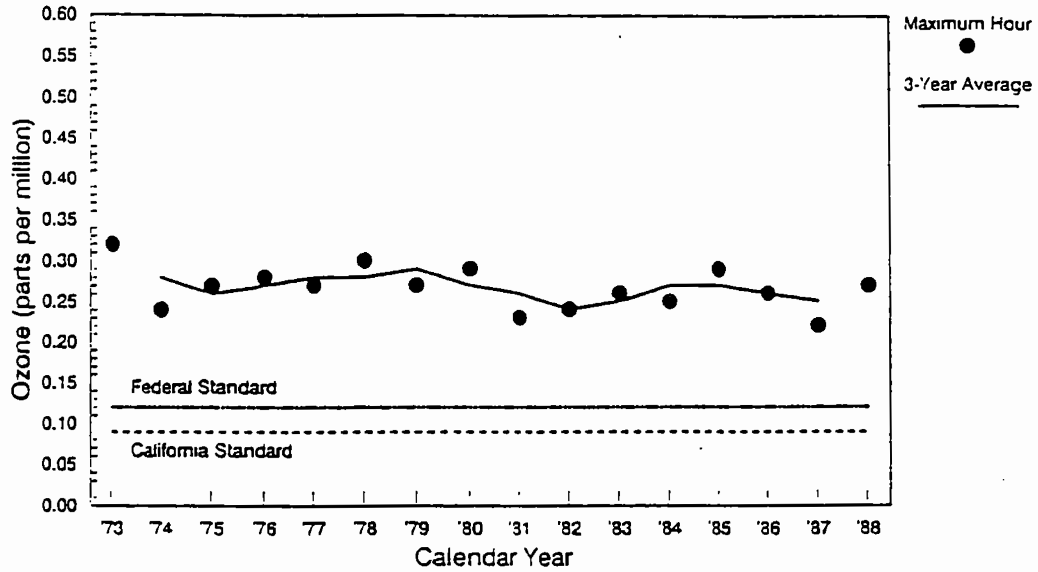


Figure 4

Violations of the California 1-Hour Ozone Standard (0.09 ppm) Southeast Desert Air Basin, 1973-1988

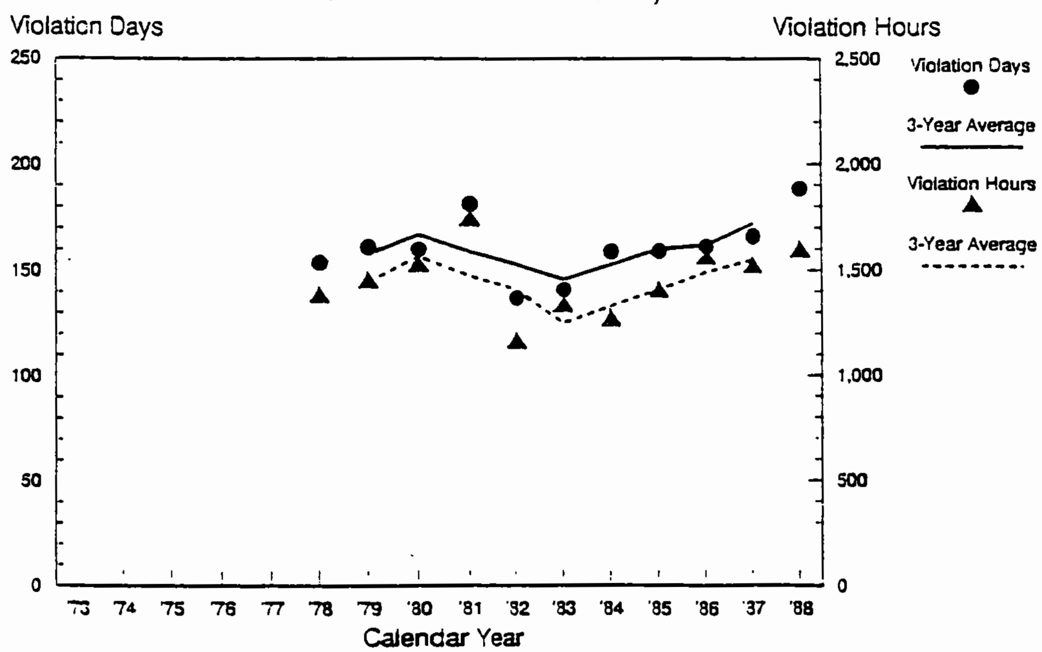


Table 4

Nitrogen Dioxide Levels in South Coast Air Basin

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.25 ppm (1-hour average)

Federal: 0.053 ppm (annual average)

	1984	1985	1986	1987	1988
Highest 1-hour average	.35	.35	.33	.42	.54
Annual average	.057	.061	.061	.055	.061
No. of days exceeding					
State standard	12	9	9	7	11

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 5

Maximum Hourly NO2 Levels in South Coast Air Basin, 1973-1988

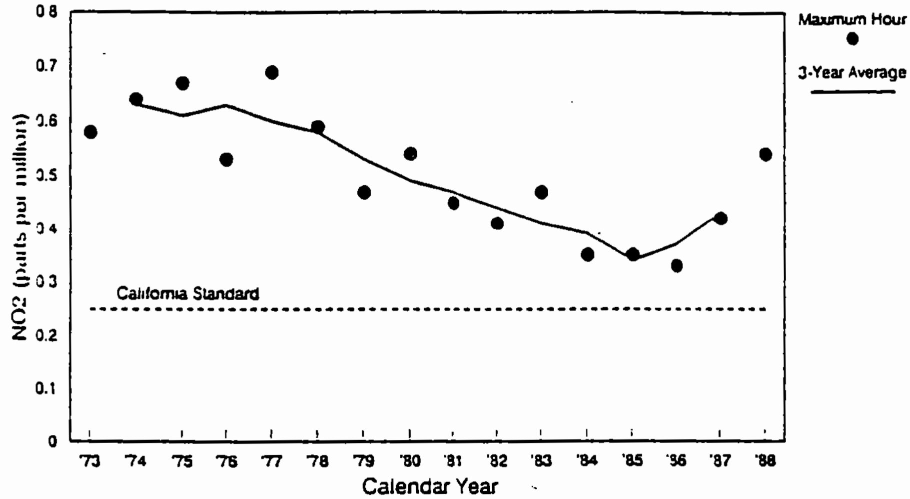
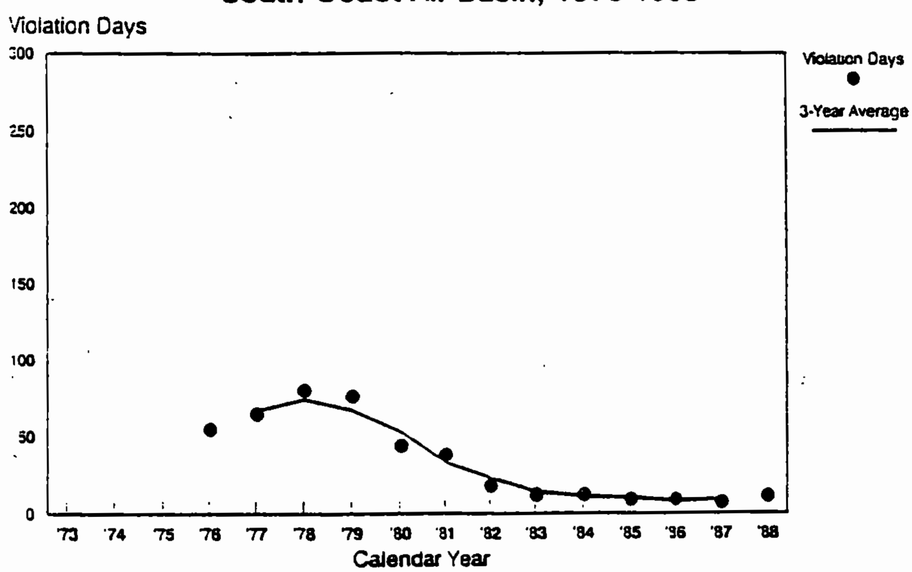


Figure 6

Violations of the California 1-Hour NO2 Standard (0.25 ppm) South Coast Air Basin, 1973-1988



Southeast Desert Air Basin

Table 5 shows the air quality standards for NO_2, plus the maximum levels recorded in the SEDAB in the period 1984-1988. The data show that NO_2 concentrations have been below the state and federal standards for several years.

Figure 7 shows the trend of maximum 1-hour NO_2 levels in the basin. They have been in a long-term decline since the late 1970's, and are currently at about half the state standard. Violation days are plotted in Figure 8. The last violation day was recorded in 1981.

C. Carbon Monoxide

South Coast Air Basin

Carbon monoxide is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas in California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors. Industrial sources of pollution typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and stagnant weather conditions.

Table 6 shows the California and federal air quality standards for CO, and the maximum 1-hour and 8-hour average levels recorded in the SCAB during the period 1984-1988. Maximum 8-hour CO levels in the basin are roughly two to three times the state and federal standards. The federal 1-hour standard is being met, but not the more stringent state standard.

The trends of maximum 8-hour average CO levels and violations of the state 8-hour standard are shown in Figures 9 and 10, respectively. The trend of maximum hourly CO levels in the Basin is shown in Figure 11. The data show that while CO levels have decreased over the last twenty years, the trends have "flattened out" over the last five to ten years, with little additional progress.

The Basin is a nonattainment area for CO for purposes of state and federal air quality planning.

Table 5

Nitrogen Dioxide Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.25 ppm (1-hour average)

Federal: 0.053 ppm (annual average)

	1984	1985	1986	1987	1988
Highest 1-hour average	.16	.14	.15	.13	.11
Annual average	.017	.018	.015	.017	.016
No. of days exceeding					
State standard	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 7

Maximum Hourly NO2 Levels in Southeast Desert Air Basin, 1973-1988

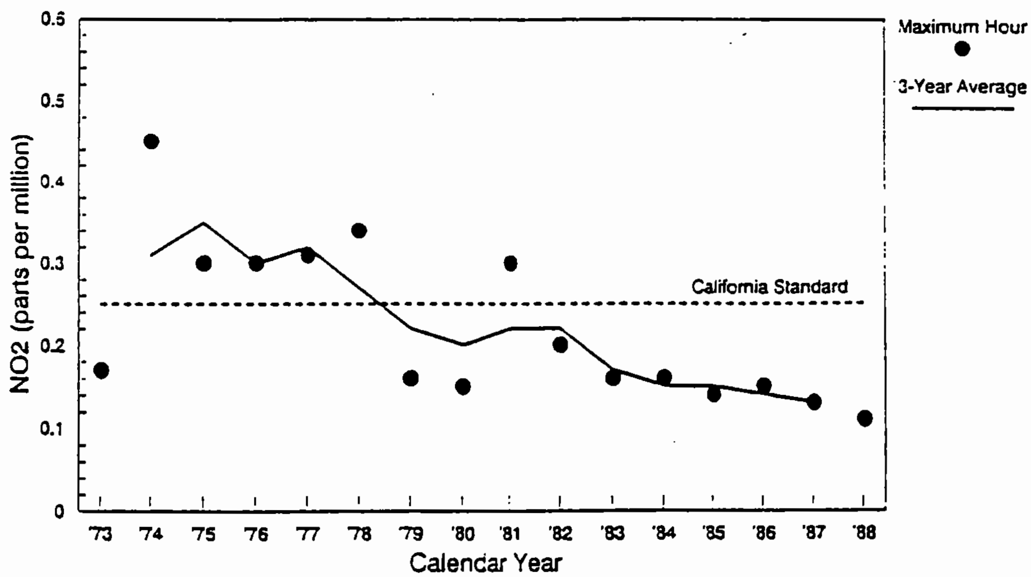


Figure 8

Violations of the California 1-Hour NO2 Standard (0.25 ppm) Southeast Desert Air Basin, 1973-1988

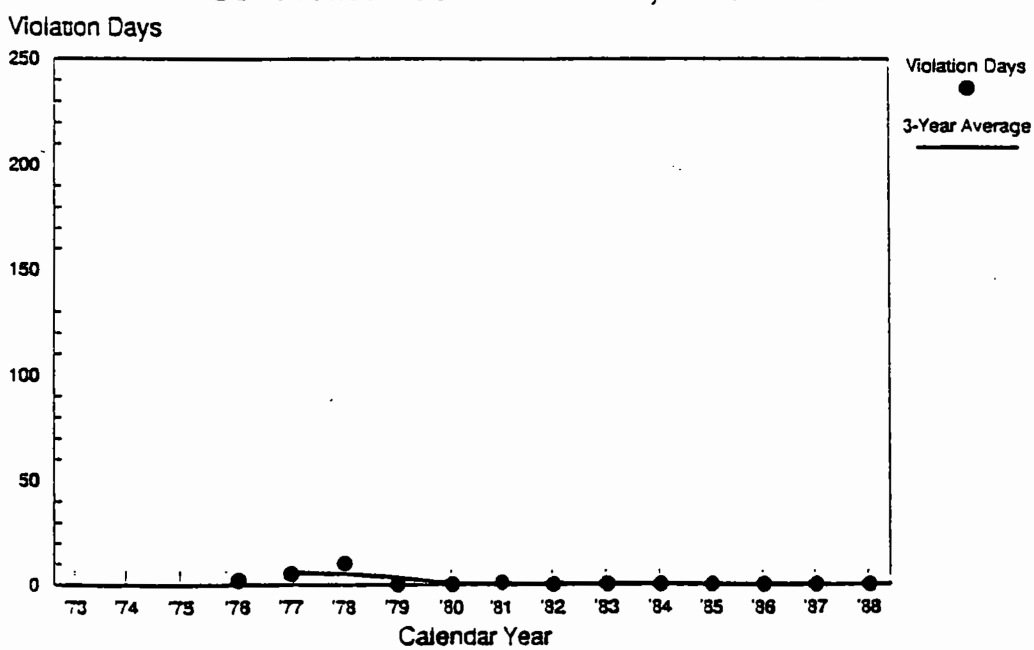


Table 6

Carbon Monoxide Levels in South Coast Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 9.0 ppm (8-hour average)

Federal: 9 ppm (8-hour average)

California: 20 ppm (1-hour average)

Federal: 35 ppm (1-hour average)

	1984	1985	1986	1987	1988
Highest 8-hour average	19.7	27.7	19.7	19.6	27.5
Highest 1-hour average	29	33	27	26	32
No. of days exceeding					
State standard (1-hr)	17	18	11	12	21
State standard (8-hr)	77	59	58	48	65
Federal standard (1-hr)	0	0	0	0	0
Federal standard (8-hr)	75	51	49	43	60

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 9

Maximum 8-Hour Average CO Levels in South Coast Air Basin, 1973-1988

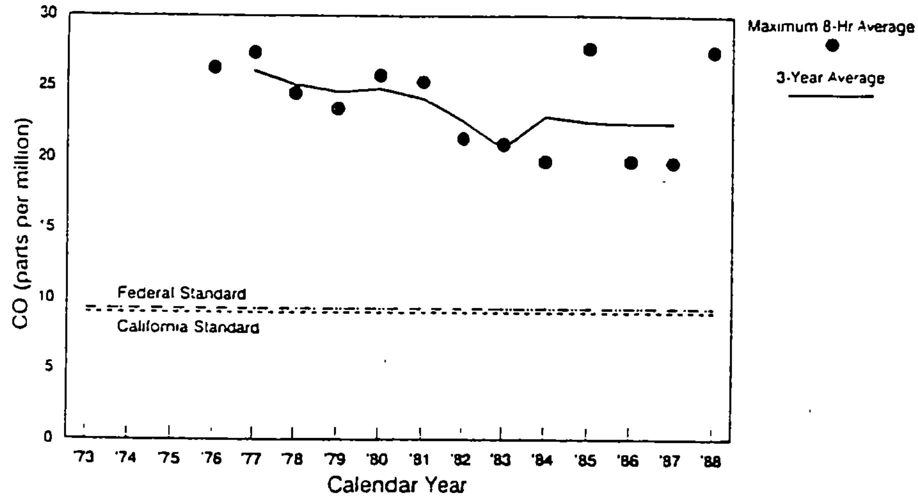


Figure 10

Violations of the California 8-Hour CO Standard (9.0 ppm) South Coast Air Basin, 1973-1988

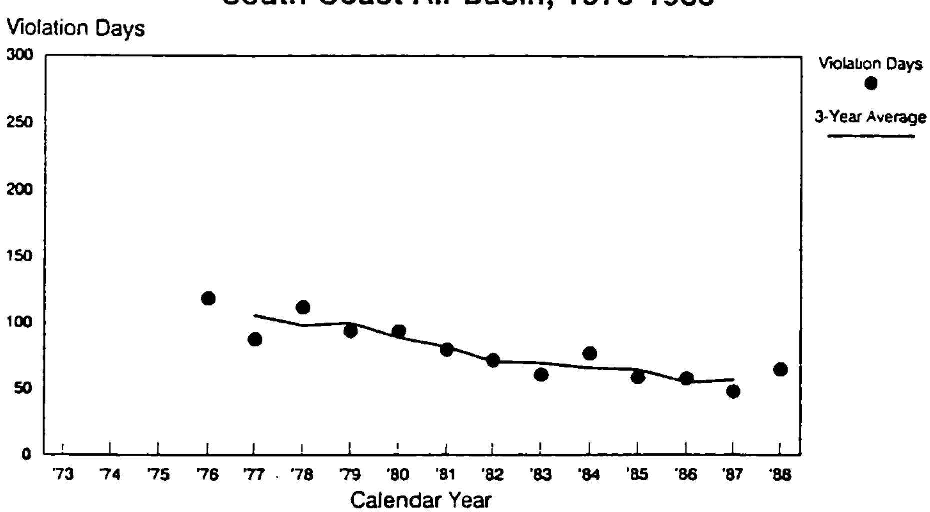
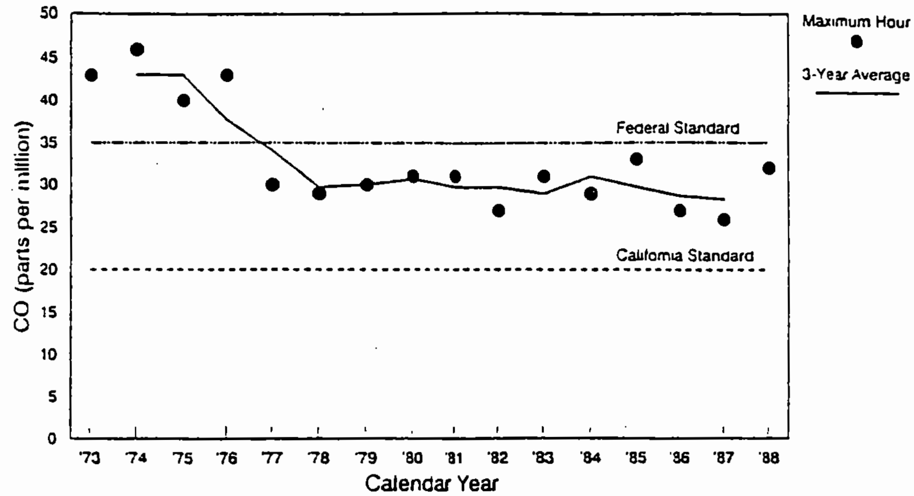


Figure 11

Maximum Hourly CO Levels in South Coast Air Basin, 1973-1988



Southeast Desert Air Basin

Table 7 shows the California and federal air quality standards for CO, and the maximum 1-hour and 8-hour average levels recorded in the SEDAB during the period 1984-1988. The data show that CO levels in the basin are well below the state and federal standards. The basin is considered in attainment for CO.

The trends of maximum 8-hour average CO levels and violations of the state 8-hour standard are shown in Figures 12 and 13, respectively. The trend of maximum 1-hour CO levels in the basin is shown in Figure 14. There have been no exceedances of any state or federal air quality standards for CO since 1979 in the Southeast Desert Air Basin. The Basin is considered an attainment area for CO for purpose of state and federal air quality planning

D. <u>Sulfur Dioxide</u>

South Coast Air Basin

Sulfur dioxide (SO_2) is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals.

Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of the state, depending on local fuel characteristics, weather, and topography.

Table 8 shows the California and federal air quality standards for SO_2, and the maximum levels recorded in the basin during the period 1984-1988. The 1984 maximum 24-hour average was slightly above the California standard; no exceedances of state or federal SO_2 standards have been observed since that time.

Figures 15 and 16 show that SO_2 levels in the SCAB generally have been within state air quality standards since 1981. The Basin is considered to be an attainment area for SO_2 purposes of state and federal air quality planning.

Southeast Desert Air Basin

Table 9 shows the California and federal air quality standards for SO_2, and the maximum levels recorded in the basin during the period 1984-1988. The data show that SO_2 levels in the SEDAB have been well within air quality standards since 1978. The most recent violation of the more-stringent state standard was in 1977 (See Figures 17 and 18). The basin is considered to be in attainment of the state and federal SO_2 standards.

Table 7

Carbon Monoxide Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 9.0 ppm (8-hour average)

Federal: 9 ppm (8-hour average)

California: 20 ppm (1-hour average)

Federal: 35 ppm (1-hour average)

	1984	1985	1986	1987	1988
Highest 8-hour average	4.9	5.7	4.6	4.4	5.9
Highest 1-hour average	10	12	9	12	13
No. of days exceeding					
State standard (1-hr)	0	0	0	0	0
State standard (8-hr)	0	0	0	0	0
Federal standard (1-hr)	0	0	0	0	0
Federal standard (8-hr)	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 12

Maximum 8-Hour Average CO Levels in Southeast Desert Air Basin, 1973-1988

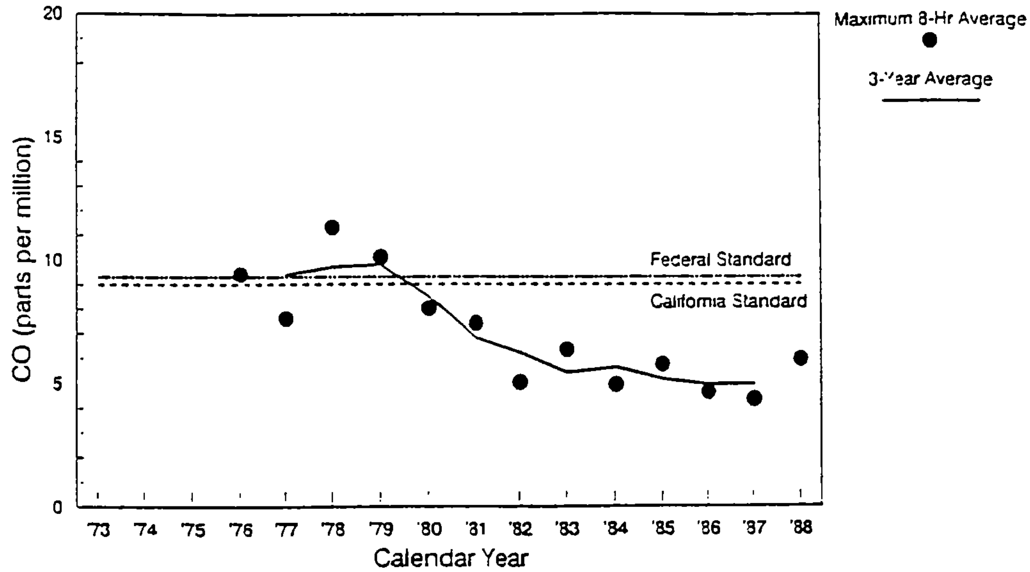


Figure 13

Violations of the California 8-Hour CO Standard (9.0 ppm) Southeast Desert Air Basin, 1973-1988

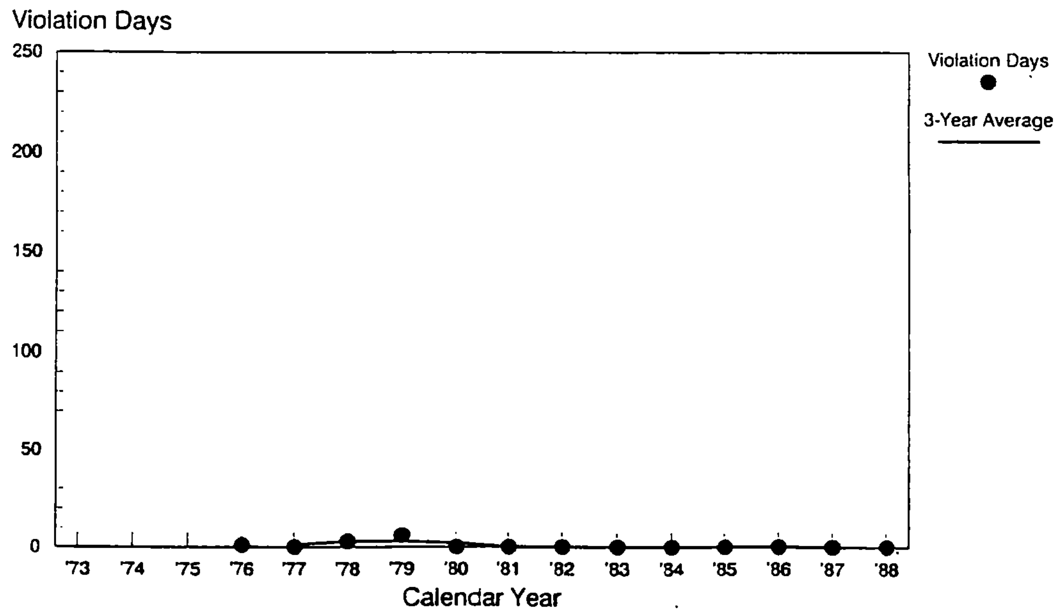


Figure 14

Maximum Hourly CO Levels in Southeast Desert Air Basin, 1973-1988

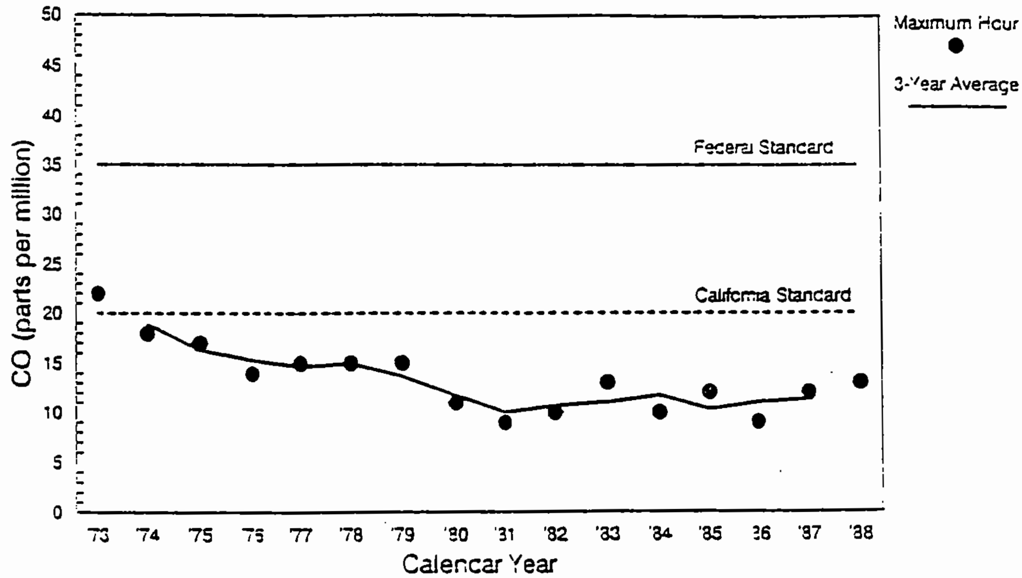


Table 8

Sulfur Dioxide Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.05 ppm (24-hour average)

0.25 ppm (1-hour average)

Federal: 0.03 ppm (annual average)

0.14 ppm (24-hour average)

	1984	1985	1986	1987	1988
Highest 24-hour average	.004	.012	.007	.001	.022
No. of days exceeding					
State standard (24-hr)	0	0	0	0	0
State standard (1-hr)	0	0	0	0	0
Federal standard (24-hr)	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 15

Maximum 24-Hour Average SO2 Levels in South Coast Air Basin, 1973-1988

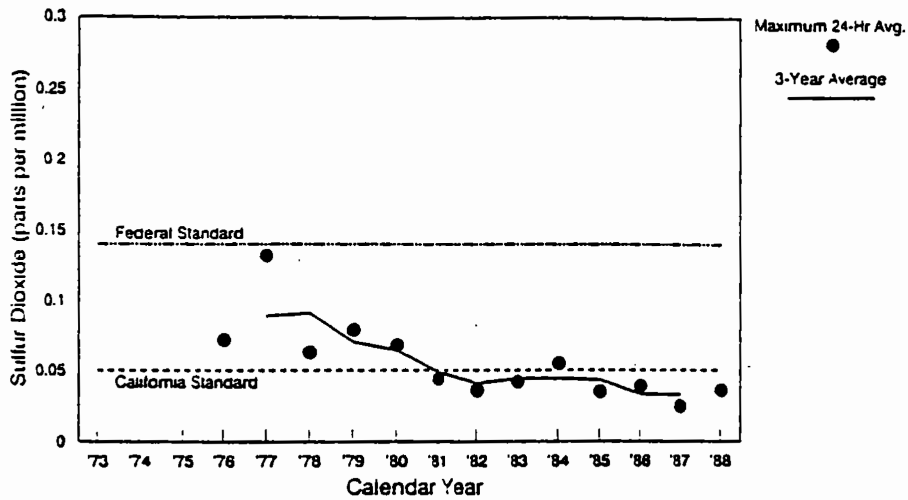


Figure 16

Violations of the California 24-Hour SO2 Standard (0.05 ppm) South Coast Air Basin, 1973-1988

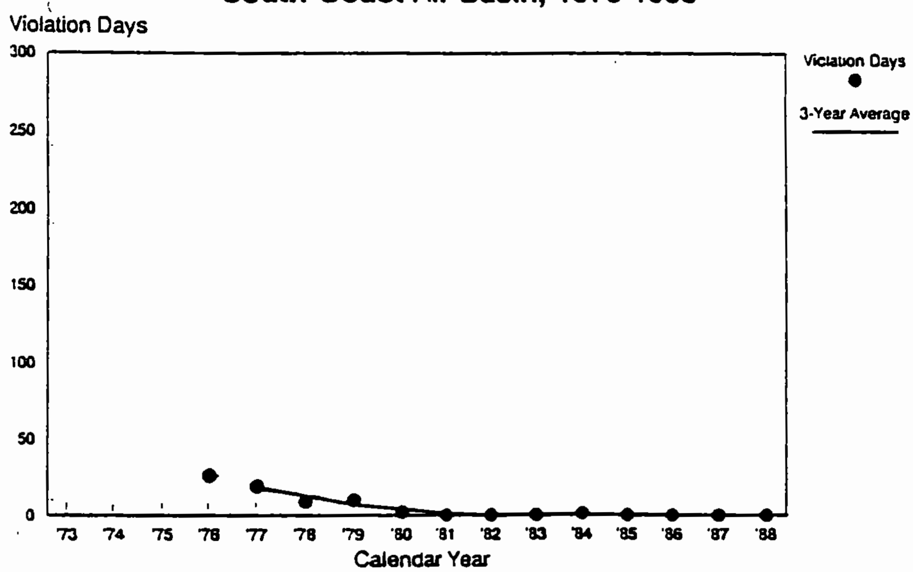


Table 9

Sulfur Dioxide Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(parts per million - ppm)

Air Quality Standards:

California: 0.05 ppm (24-hour average)

0.25 ppm (1-hour average)

Federal: 0.03 ppm (annual average)

0.14 ppm (24-hour average)

	1984	1985	1986	1987	1988
Highest 24-hour average	.004	.012	.007	.001	.022
No. of days exceeding					
State standard (24-hr)	0	0	0	0	0
State standard (1-hr)	0	0	0	0	0
Federal standard (24-hr)	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 17

Maximum 24-Hour Average SO2 Levels in Southeast Desert Air Basin, 1973-1988

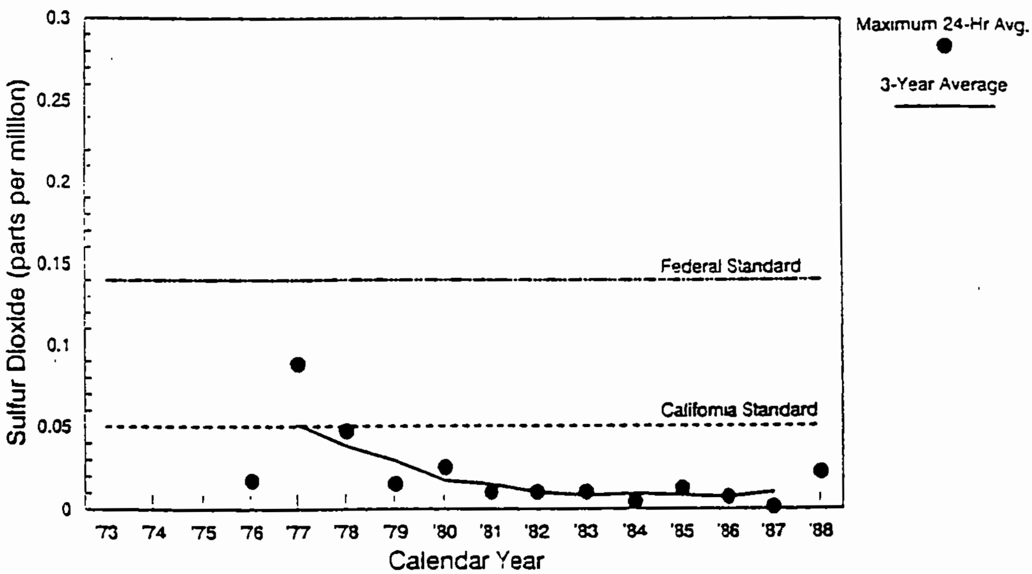
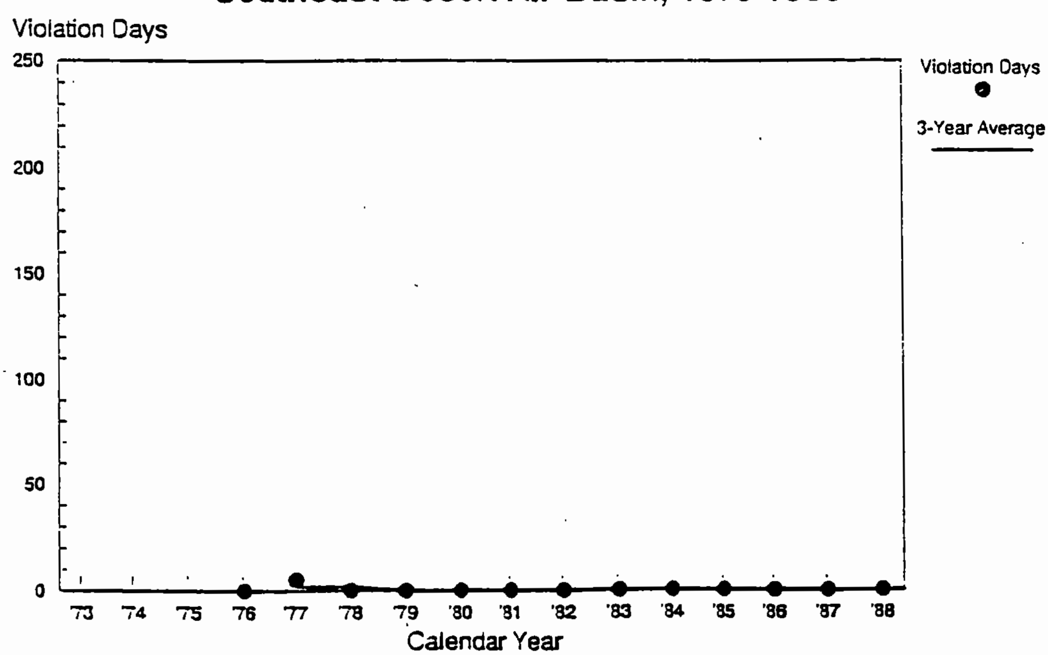


Figure 18

Violations of the California 24-Hour SO2 Standard (0.05 ppm) Southeast Desert Air Basin, 1973-1988



E. Particulate Sulfates

South Coast Air Basin

Particulate sulfates are the product of further oxidation of sulfur dioxide. Elevated levels can also be due to natural causes, such as sea spray.

Table 10 shows the California air quality standard for particulate sulfate and the maximum levels recorded in the basin during the period 1984-1988. Maximum 24-hour sulfate levels do not quite meet the state standard.

The trend of maximum 24-hour average sulfates in the SCAB since 1976 is plotted in Figure 19, and the trend of violations is shown in Figure 20. Figure 19 shows that maximum sulfate concentrations have been in a steady decline for several years, although they may have leveled out in the late 1980's.

The Basin is a nonattainment area for sulfates for state air quality planning purposes. There is no federal standard for sulfates.

Southeast Desert Air Basin

Table 11 shows the California air quality standard for particulate sulfate and the maximum levels recorded in the basin during the period 1984-1988. In 1985 and 1986, the maximum readings were abnormally high. These aberrant levels were recorded at China Lake during a brief period of extremely high winds that entrained the naturally-occurring sulfates from the dry lake there. To give some perspective to the readings, the second-highest readings for the 1984-88 period are also presented.

The trend of maximum 24-hour average sulfates in the SEDAB since 1976 is plotted in Figure 21, and the trend of violations is shown in Figure 22. In Figure 21, the 3-year running average includes the second-highest readings for 1985 and 1986, rather than the abnormally high maximum levels recorded in those years. The basin is considered attainment for state air quality planning purposes.

Table 10

Particulate Sulfates Levels in South Coast Air Basin
(Worst Case)

1984-1988
(micrograms per cubic meter - $\mu g/m^3$)

Air Quality Standards:

California: 25 $\mu g/m^3$ (24-hour average)

	1984	1985	1986	1987	1988
Highest 24-hour average	28.3	31.0	26.3	20.6	28.1
No. of days exceeding					
State standard	2	1	4	0	2

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 19

Maximum 24-Hour Average Sulfate Levels in South Coast Air Basin, 1973-1988

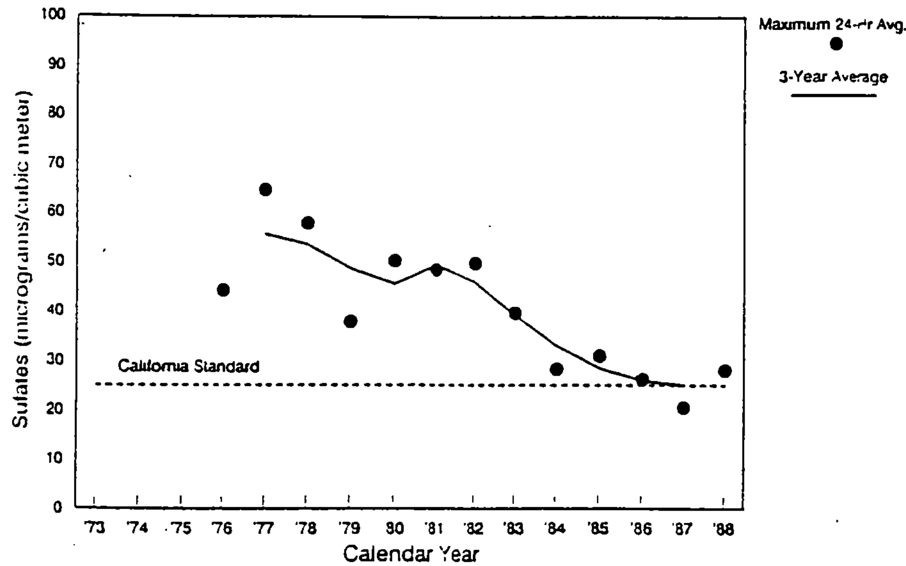
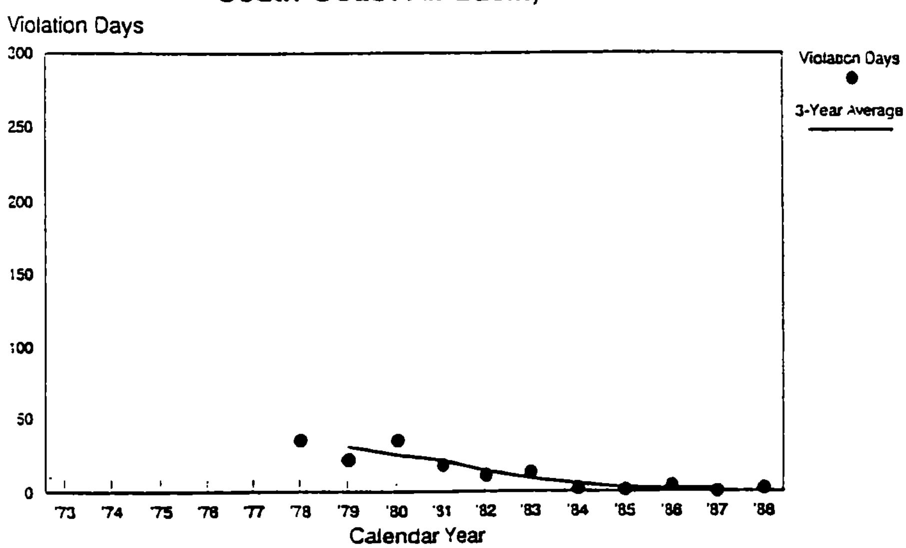


Figure 20

Violations of the California 24-Hour Sulfate Standard South Coast Air Basin, 1973-1988



Note: Standard is 25 micrograms/cubic meter.

Table 11

Particulate Sulfates Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(micrograms per cubic meter - $\mu g/m^3$)

Air Quality Standards:

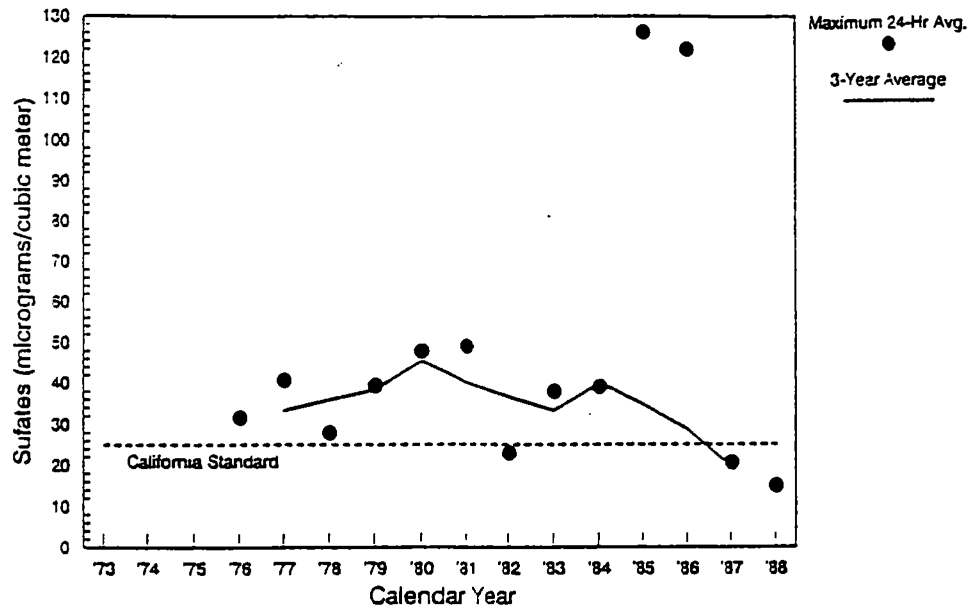
California: 25 $\mu g/m^3$ (24-hour average)

	1984	1985	1986	1987	1988
Highest 24-hour average	39.0	126.1	122.0	20.5	14.8
2nd highest 24-hour average	29.9	42.7	22.5	16.9	14.5
No. of days exceeding					
State standard	2	2	1	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

Figure 21

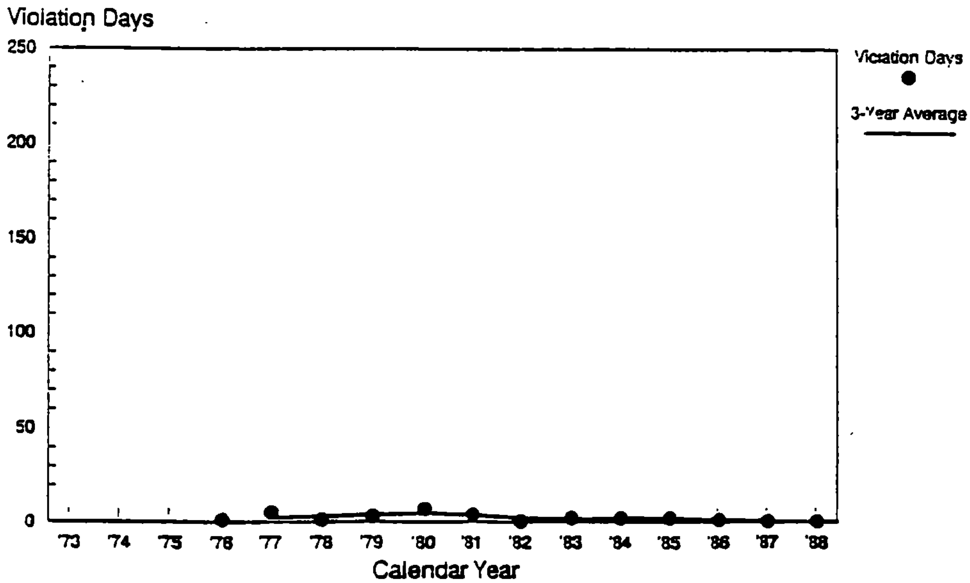
Maximum 24-Hour Average Sulfate Levels in Southeast Desert Air Basin, 1973-1988



Note: 3-Year Average includes 2nd-highest readings from 1985-86.

Figure 22

Violations of the California 24-Hour Sulfate Standard Southeast Desert Air Basin, 1973-1988



Note: Standard is 25 micrograms/cubic meter.

F. Fine Particulates (PM10)

South Coast Air Basin

Particulates in the air are caused by a combination of wind-blown fugitive dust, particles emitted from combustion sources (usually carbon particles), and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and oxides of nitrogen.

Beginning in 1984, the ARB adopted standards for fine particulates (PM10 - particulate matter less than 10 microns in size), and phased out the pre-existing total suspended particulate (TSP) standards. PM10 standards were substituted for TSP standards because PM10 corresponds to the size range of inhalable particulates related to human health. In 1987, EPA also replaced national TSP standards with PM10 standards.

Table 12 shows the California and federal air quality standards for fine particulates, as well as maximum and second-highest levels recorded in the SCAB during the period 1984-1988. The 24-hour levels are four to six times the state standard.

Maximum 24-hour levels and violations for the period 1984-1988 are graphically depicted in Figures 23 and 24, respectively. There are not enough years of observation to reveal a trend.

The Basin is a nonattainment area for PM_{10} for purposes of state air quality planning. Upon promulgation of the PM10 regulations by the U.S. Environmental Protection Agency, all areas were designated attainment areas, regardless of the current air quality standing for total suspended particulates (TSP).

Southeast Desert Air Basin

Table 13 shows the California and federal air quality standards for fine particulates, as well as maximum and second-highest levels recorded in the SEDAB during the period 1984-1988. The data show that both state are being exceeded about 50 days per year, while federal standards are exceeded less than 10 days per year.

Maximum 24-hour levels and violations for the period 1984-1988 are graphically depicted in Figures 25 and 26, respectively. There are not enough years of observation to reveal a trend.

The Basin is considered a nonattainment area for PM10 for state air quality planning purposes. Upon promulgation of the PM10 regulations by the U.S. Environmental Protection Agency, all areas were designated attainment areas, regardless of the current air quality standing for total suspended particulates (TSP).

Table 12

Fine Particulate (PM10) Levels in South Coast Air Basin
(Worst Case)

1984-1988
(micrograms per cubic meter - $\mu g/m^3$)

Air Quality Standards:

California: 50 $\mu g/m^3$ (24-hour average)

30 $\mu g/m^3$ (annual geometric mean)

Federal: 150 $\mu g/m^3$ (24-hour average)
50 $\mu g/m^3$ (annual arithmetic mean)

	1984	1985	1986	1987	1988
Highest 24-hour average	135	208	294	219	289
Annual geometric mean*	41.2	80.9	111.2	73.5	91.9
Annual arithmetic mean*	53.4	96.1	111.3	89.6	104.6
No. of days exceeding					
State standard (24-hr)	7	59	60	58	65
Federal standard (24-hr)	0	11	8	9	11

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

*No basinwide summary available. Annual means are highest station in the Basin.

Figure 23

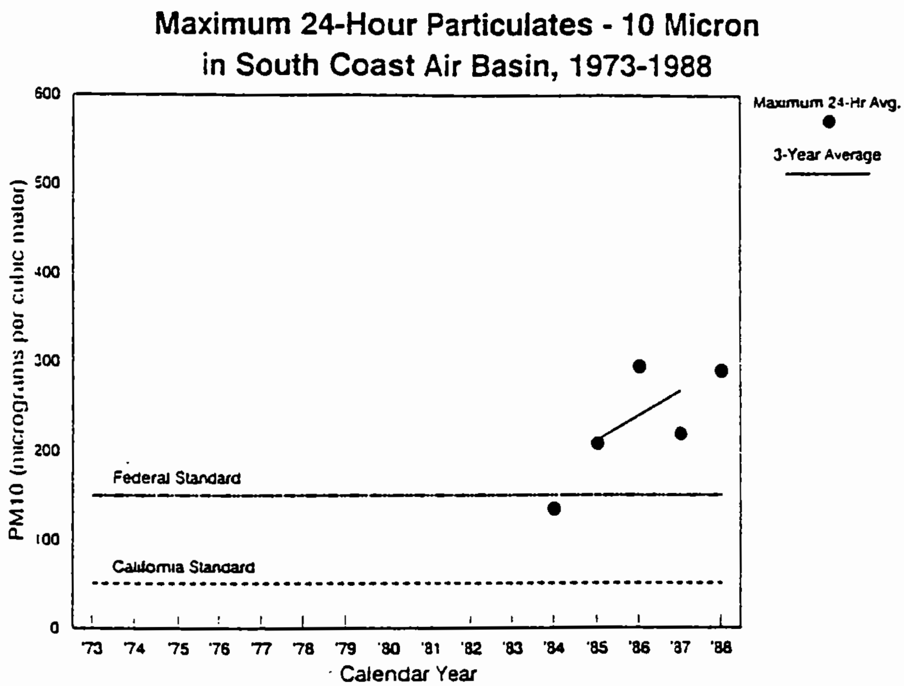
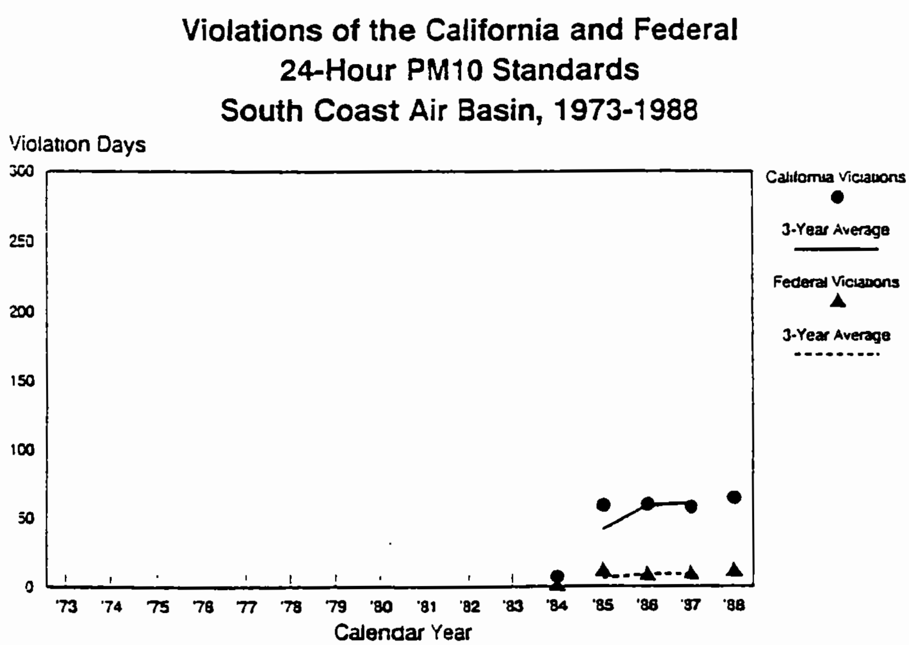


Figure 24



California Standard is 50 micrograms/cubic meter
Federal Standard is 150 micrograms/cubic meter

Table 13

Fine Particulate (PM10) Levels in Southeast Desert Air Basin
(Worst Case)

1984-1988
(micrograms per cubic meter - $\mu g/m^3$)

Air Quality Standards:

California: 50 $\mu g/m^3$ (24-hour average)

Federal: 150 $\mu g/m^3$ (24-hour average)

California: 30 $\mu g/m^3$ (annual geometric mean)

Federal: 50 $\mu g/m^3$ (annual arithmetic mean)

	1984	1985	1986	1987	1988
Highest 24-hour average	65	496	230	171	368
2nd highest 24-hour average	60	358	191	163	192
Annual geometric mean*	37.3	59.9	59.3	65.2	58.6
Annual arithmetic mean*	39.5	70.9	64.1	75.8	66.2
No. of days exceeding (24-hour average)					
State standard	6	57	54	56	56
Federal standard	0	6	2	3	2

Source: California Air Quality Data, Annual Summary, California Air Resources Board.

* No basinwide summary available. Annual means are highest station reading in Basin.

Figure 25

Maximum 24-Hour Particulates - 10 Micron in Southeast Desert Air Basin, 1973-1988

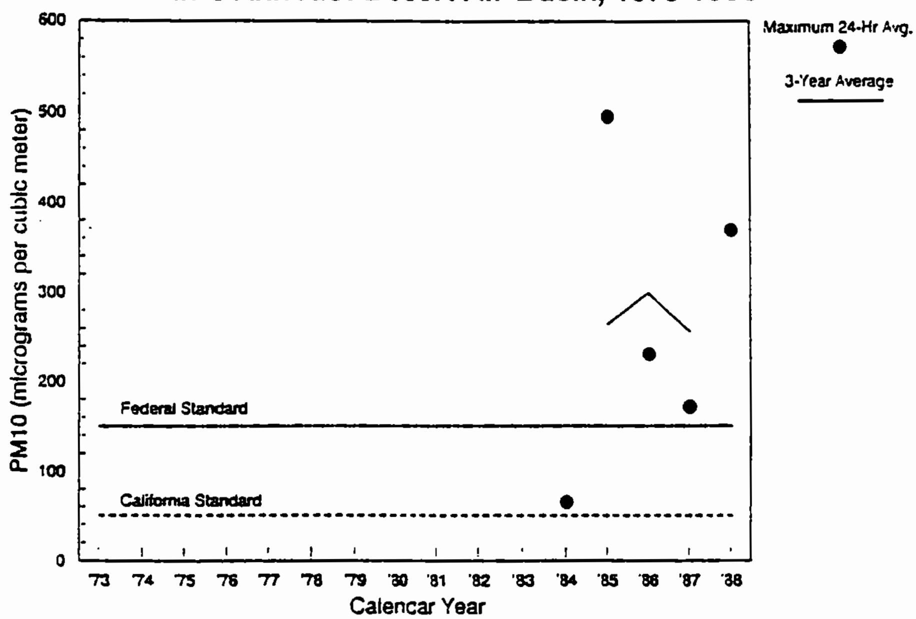
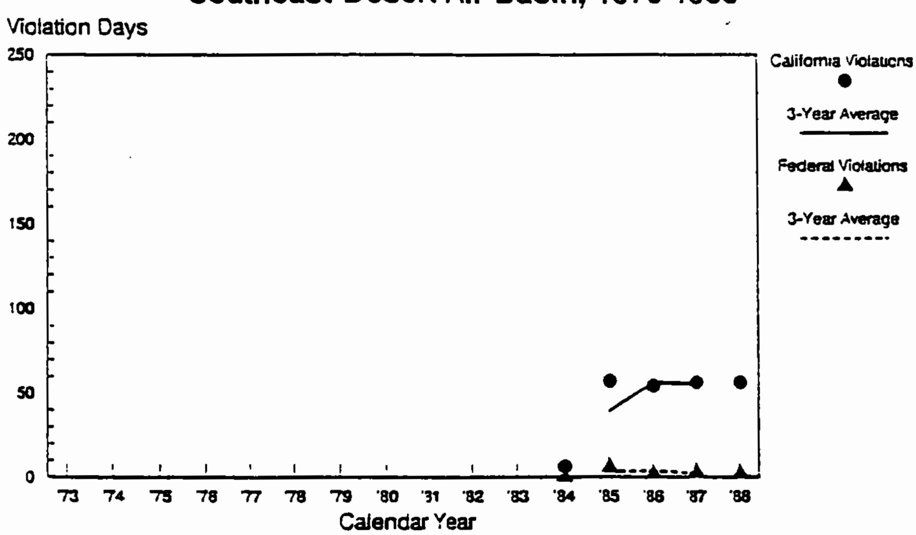


Figure 26

Violations of the California and Federal 24-Hour PM10 Standards Southeast Desert Air Basin, 1973-1988



California Standard is 50 micrograms/cubic meter
Federal Standard is 150 micrograms/cubic meter

5. OTHER AIR QUALITY ISSUES

A. Regional Visibility

South Coast Air Basin

Visibility refers to the clarity of the atmosphere and is typically measured as the distance one can see at a particular location and time. Visibility through the atmosphere is restricted by the absorption and scattering of light by both gases and particles. Natural phenomenon which contribute to decreased visibility include fog, precipitation, blowing sand/snow, and relative humidities greater than 70%. Manmade conditions which reduce visibility include the emission of combustion gases which transform in the atmosphere to form very small particles termed "aerosols".

The South Coast Air Basin experiences some of the poorest visibility in California. Corrected to eliminate the effects of weather, the median visibilities recorded at 1 p.m. daily during 1974 through 1976 at Long Beach and Ontario were 10 and 7 miles, respectively.[2] These low levels are likely caused by high concentrations of oxides of sulfur, oxides of nitrogen, hydrocarbon, and particulate emissions in the air basin. The problem is made worse by low wind speeds, strong inversion layers, and intense sunlight (leading to high production rates of aerosols).

Visibility in the South Coast varies both hourly and seasonally. The major influence is from aerosol levels, while water vapor from the ocean has a strong effect in coastal regions. Aerosol levels vary with the emission rates of combustion gases and the strength of sunlight heating the atmosphere. Generally, visibility is highest in the morning due to lower pollutant emission rates and lower formation rates of aerosols at night. As the day progresses, emission rates increase with increasing traffic levels, and higher sun angles accelerate the production of aerosols. Maximum aerosol concentrations, and lowest visibilities, occur in mid-afternoon before lower angles of the sun slow down aerosol production rates.

In coastal regions, water vapor levels generally have a greater effect on visibility than aerosol concentrations in spring and summer. At night, cooler temperatures cause water vapor from the ocean to form very small droplets. These droplets act like aerosol particles in scattering light, causing severe reductions in visibility especially when droplets become numerous enough to create fog. Later in the day, fog and high humidity conditions are broken up as the air is heated by sunlight. In this situation, visibility is lowest in the morning and best at midday.

Seasonal changes in visibility are almost entirely due to fluctuations in aerosol concentrations. Throughout the air basin, visibility is lower in the spring and summer, and improved in the fall and winter. These trends correlate closely with sulfate and nitrate concentrations, and point to variations in production of these pollutants which are climate related. In the summer, solar radiation is higher, inversions are stronger, and transport winds are lighter, maximizing the production of aerosol and trapping it within the air basin. In the winter, lower aerosol production rates and greater dispersion out of the air basin result in lower concentrations and improved visibility. In coastal areas, fog and high humidity conditions also cause morning visibilities in the spring and summer to be lower than those in the fall and winter.

Historically, visibility trends at downtown Los Angeles have varied in a cyclical fashion. During the early 1940's, a sharp deterioration occurred during the industrial expansion of the war years. As air pollution controls were imposed in the late 1940's, significant improvement was observed. A gradual deterioration in visibility during the mid-1950's was due to growth (especially in automobile traffic) outstripping stationary source controls. This trend was again reversed as automotive controls came into effect and stationary source controls were further tightened, causing visibility to slowly improve through 1986.[3] The net result for the period 1958 to 1986 was moderate improvement in visibility for the coastal portion and moderate or no improvement for the inland portion of the air basin. These trends are shown in Figure 27.

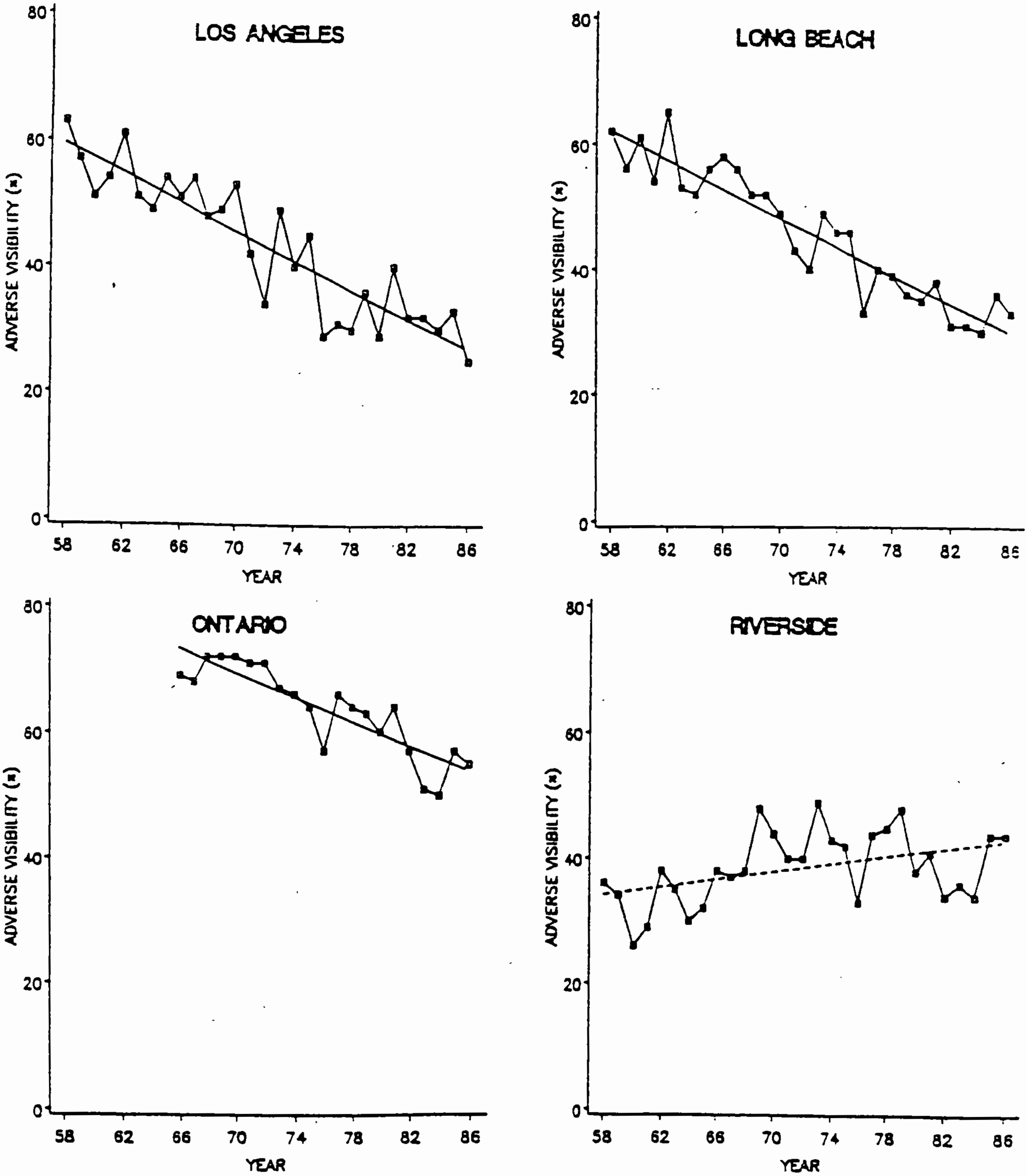
Southeast Desert Air Basin

The Southeast Desert Air Basin experiences improving visibilities when viewed from west to east. Near the urbanized western edge of the air basin, midday visibilities average 15 miles, while in the remote desert regions at the east end, average visibilities approach 70 miles. As relative humidities in the air basin are usually below 70%, water vapor in the air does not significantly influence visibility levels. In the absence of large cities or industrial complexes, the greatest contribution to visibility degradation is made by the transport of aerosols from the South Coast and southern San Joaquin Air Basins.

Visibility in the Southeast Desert varies seasonally with changing aerosol levels. Minimum visibilities occur during the spring and summer due to increased transport of aerosol from upwind urban areas. A contribution to deterioration is also made by local sources of fugitive dust during drier, windier summer conditions. Limited data indicate that the hourly variation in visibility is small, confirming the small effect on visibility contributed by water vapor.

Historically, the locations nearest the air basin where visibility was recorded were the Ontario and Riverside airports in the eastern end of the South Coast Air Basin. At these locations, visibility has either moderately improved or shown no significant change between 1958 and 1986.

Figure 27



*Adverse visibility is defined as being less than 10 miles when the relative humidity is less than 70% (the California ambient air standard for visibility reducing particles). The long term trend line is shown either being flat, increasing or decreasing. A dashed trend line indicates that a model departing from simple linearity would be more representative.

ARB/ADD 5/87

B. Acid Deposition

Acid deposition occurs as acid rain, acid fog, acid cloud water, acid snow, and dry deposition of both gases and particles. Examples of dry deposition include nitric acid vapors, organic acid vapors, and sulfuric acid mist. Acid deposition is a result of the emissions of sulfur and nitrogen oxides. These emissions may come from sources such as industrial power plants, motor vehicles, or chemical manufacturing plants. Damage from acid deposition has been widely investigated in the Eastern States. In that region, problems include the acidification of lakes and streams and the harmful effects on vegetation, especially forests and grassland, from acid rain incidents.

Because of the concern regarding the potential adverse effects which acid deposition might have on the general population, the ecological system, and various man-made materials, the Kapiloff Acid Deposition Act of 1982 (Act) was adopted by California Legislature. This Act required a five-year research and monitoring program to review the problem, an investigation of the causes and effects in California, and the possible development of strategies for reducing acidic deposition. This research program continues today under the direction of the California Air Resources Board.

Unlike conditions found in the Eastern U.S., California's acid deposition problems are different and less severe. Chronically acidified lakes or streams have not been found in California. However, there are California lake watersheds in the high elevations of the Sierra Nevada that have low acid-neutralizing capacity and suffer from episodic acidification rather than chronic acidification. In addition, California experiences less acid rain because of the limited annual precipitation, compared to the East. Acid fog is more common in California and is typically 100 times more acidic than acid rain. Acid fog occurs in urban coastal areas and in the southern San Joaquin Valley. Dry deposition of gases and particles contribute greatly to acid deposition in southern California. Urban coastal sites experience the most acidic deposition, both wet and dry, with nitric acid being the predominant acid of both forms.

Paints and building materials are also affected by acid deposition. Exposure of paints on building exteriors to acidic air pollution has resulted in discoloration. In the Los Angeles area, it has been determined that smog damages various materials. Because elevated concentrations of acidic air pollution occur with the presence of smog, other materials such as concrete and various metals (i.e., steel, nickel, aluminum) are currently being investigated to determine the extent of damage which acid deposition might have directly on them.

C. Toxic Air Pollutants

In California, public concerns about emissions of toxic substances to the atmosphere have lead to three statewide programs regulating such releases:

- The toxic air contaminants program, which is often called the AB 1807 or Tanner process, referring to the enabling bill and its author;

- The toxic "hot spots" program, enacted in AB 2588 (Toxic "Hot Spots" Information and Assessment Act"); and

- Proposition 65, the "Safe Drinking Water and Toxic Enforcement Act".

In addition, local air pollution control districts and other environmental regulatory agencies have adopted specific programs that require inventories or additional control of emissions of toxic substances and other hazardous materials. (See Regulatory Setting for details about these local programs.)

The Tanner bill (AB 1807) established a formal procedure for designating certain substances as toxic air contaminants. This process is also used to establish measures that reduce emissions of these toxic air contaminants. Currently, there are about 60 different substances or chemical categories that have been designated as toxic air contaminants, are being reviewed, or will be reviewed when sufficient information is available. During the identification phase, the staffs of the California Air Resources Board and the Department of Health Services concurrently prepare reports that assess exposure and health effects, respectively. Their report is made available for public comment before it is submitted to a Scientific Review Panel for review. If the Scientific Review Panel is satisfied with the report, it recommends to the Air Resources Board that the substance be designated as a toxic air contaminant. After a public hearing, a final decision is made by the Air Resources Board. The substances that have been designated as toxic air contaminants to date include:

asbestos
benzene
cadmium
carbon tetrachloride
chlorinated dioxins and furans
ethylene dibromide
ethylene dichloride
ethylene oxide
hexavalent chromium
methylene chloride

Of the substances still under review, several are expected to be completed in the next two years:

acetaldehyde
inorganic arsenic
benzo(a)pyrene
1,3-butadiene
chloroform
Diesel exhaust
formaldehyde
nickel
perchloroethylene
trichloroethylene
vinyl chloride

The Air Resources Board develops and adopts an Airborne Toxics Control Measure for each of the designated toxic air contaminants. If there is a safe threshold for a substance (i.e., a level below which there is no toxic effect), the control measure must reduce the emissions so that exposure is below the threshold. If there is no safe threshold, the measure must reduce emissions to the lowest level that can be achieved using the best available control technology. All of the substances that have been designated as toxic air contaminants so far are cancer-causing substances for which there is no safe threshold. After the Air Resources Board adopts the Air Toxics Control Measure, it is adopted by the local air district, which is responsible for enforcing the control measure.

In 1987, the California Legislature enacted AB 2588. AB 2588 established a process for developing an inventory of toxic substances, determining health risks, and notifying the public regarding these risks. This Act requires facilities to develop emission inventories for selected toxic substances and submit the inventories to the local air districts. The emission inventories will assist the Air Resources Board and local districts in setting priorities for controlling toxic air contaminant emissions and will provide information to the public regarding the presence of these substances and associated health risks. The Act requires the Air Resources Board to establish a list of chemicals subject to the Act. Currently, the list includes more than 300 chemicals and chemical categories.

A facility is subject to AB 2588 if it

(1) manufactures, formulates, uses, or releases any of the listed substances (or any substance that reacts to form any of the listed substances) <u>and</u>

(2) emits more than 10 tons of nitrogen oxides, organic gases, sulfur oxides, or particulates per year.

A facility subject to this law must submit an inventory plan (i.e., a description of the methods the facility will use to prepare the inventory) to the local air district. After the district has approved the plan, the facility prepares an inventory report and submits the data to the district.

After collecting the data from these facilities, the district will rank the facilities in low, intermediate, and high priority categories. The ranking is based on the potency, toxicity, quantity, and volume of hazardous materials released from the facility; distance to sensitive receptors; and other factors. Facilities in the highest priority category must assess the health risks caused by their emissions. After the health risk assessment is approved, the facility must notify all exposed persons about the results of the assessment if the district finds a high risk is associated with the emissions from the facility. In addition, the districts are required to publish an annual report on the findings of the emission inventory, the priority list of the facilities, estimated health risks, and related topics.

Proposition 65 does not directly control toxic air emissions, but it does require that warnings be provided to the affected public if they are exposed to significant concentrations of substances listed by the Governor as causing cancer or reproductive toxicity. Nearly 370 substances and classes of chemicals have been listed as cancer-causing or as reproductive toxicants as of January 1, 1990. Starting twelve months after a chemical is listed by the Governor, a "clear and reasonable" warning must be provided to individuals that are exposed to the substance unless the exposure meets the "no significant risk" criterion. For substances that cause cancer, the "no significant risk" level is established as one excess case of cancer in an exposed population of 100,000, assuming a lifetime exposure. For reproductive toxicants, the "no significant risk level" is 1/1000 of the level at which no effects on test animals have been observed. Proposition 65 also prohibits discharges of the listed chemicals that pass into drinking water sources. An air emission may be prohibited if it "more likely than not" will pass into a drinking water source.

D. Interbasin Transport

The transport of air pollutants from one air basin to another occurs when there are winds of sufficient speed, duration, and direction. Both ozone and ozone precursors, including hydrocarbons and nitrogen oxides, may be transported. In addition, PM_{10} precursors, including organic, sulfate and nitrate aerosols, may be transported.

One of the difficulties in understanding air pollution transport in California is that there is significant variability of the geography and meteorology throughout the State. These characteristics vary from the cool, rainy areas of the north coast to the arid regions of the Mojave and Colorado Deserts in the Southwest. Because of this great variability, the State has been subdivided into air basins, each of which comprises areas of similar meteorological and geographic conditions.

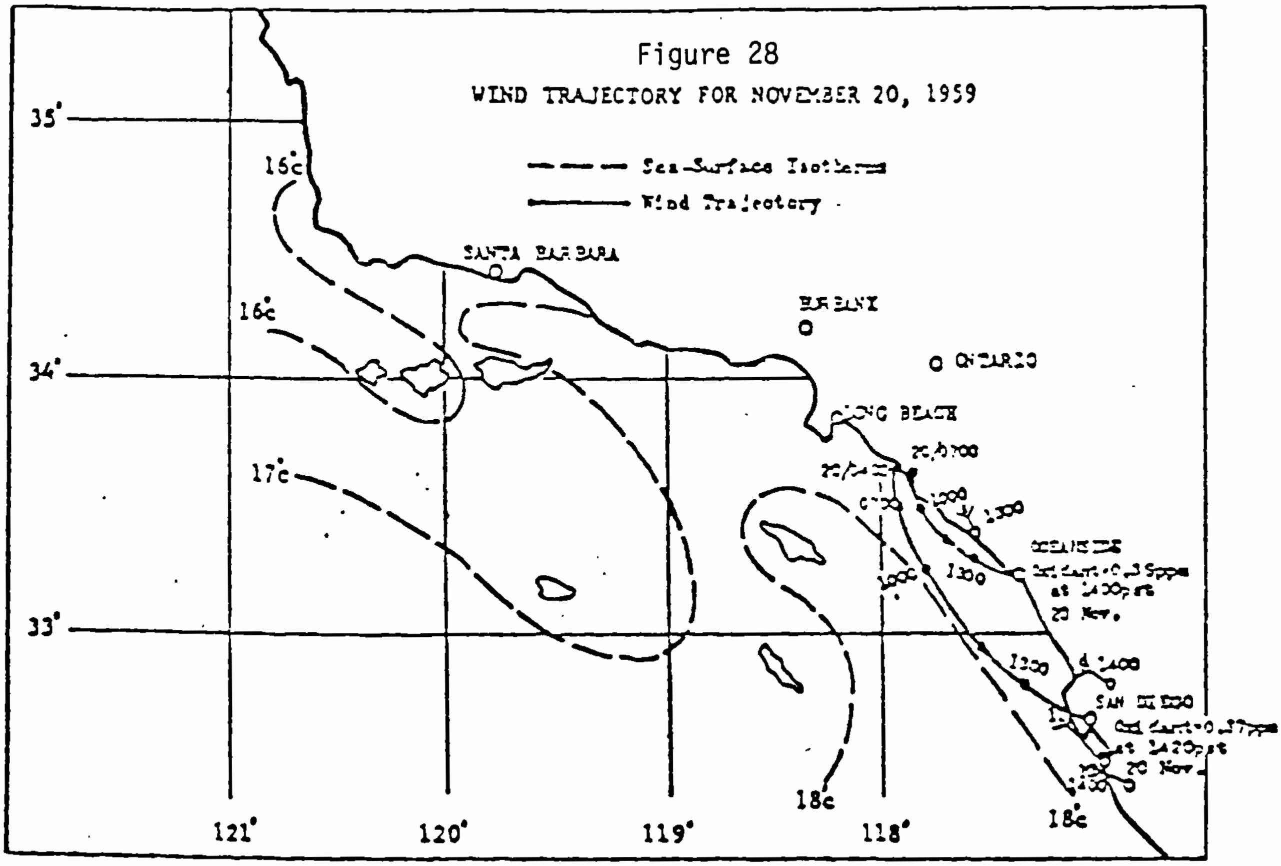
In several studies completed by the Air Resources Board (ARB) over the last ten years, it has been shown that transport of air pollutants from an upwind area can contribute to measured violations of air quality standards in downwind areas under certain conditions. The ARB studies used surface air trajectory analyses in order to identify pollutant transport pathways.

South Coast Air Basin Focus

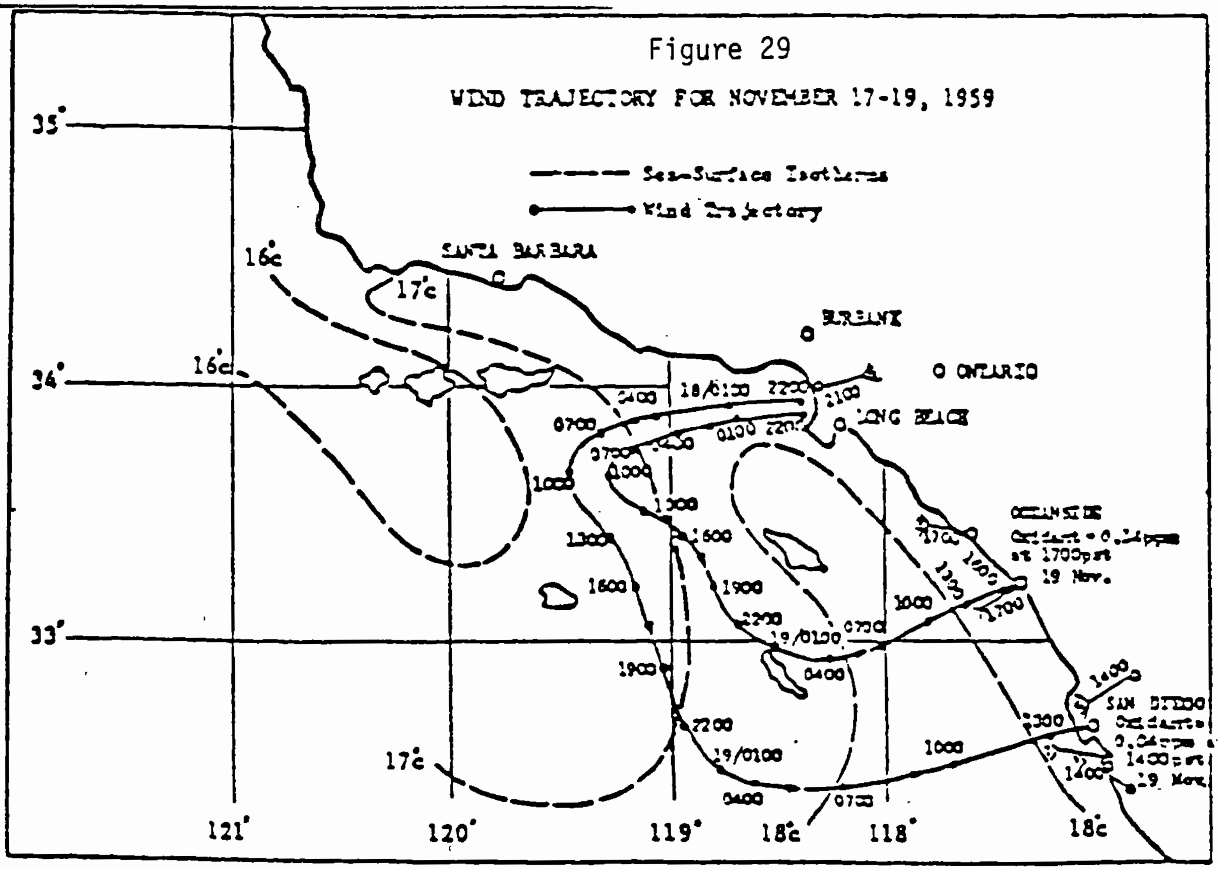
Transport from the South Coast Air Basin to San Diego County can take place if northwesterly winds develop after contaminated air masses in the Los Angles Basin have moved to the coastal zone. The pollutants follow a pathway beginning off the coast of Los Angeles, extending southward along the coast, until it crosses land again between the cities of Oceanside and San Diego. Not every instance of transport from the South Coast Air Basin to San Diego County causes a substantial air quality impact. Low inversions along the coast are necessary to concentrate the ozone and its precursors in the marine layer below the inversion. Two trajectories from the South Coast Air Basin to San Diego County are shown on Figures 28 and 29 (reproduced from ARB's staff report on identification of Districts affected by pollutant transport, dated October 1989).

In addition to transport to San Diego County, there is also pollutant transport from the South Coast Air Basin to the Southeast Desert Air Basin. The three major pollutant transport corridors between the two Air Basins are the Soledad Canyon, Cajon Pass, and San Gorgonio Pass. Figure 30 illustrates these three pathways (reproduced from ARB's October 1989 staff report). The San Gorgonio Pass connects the Los Angeles Basin to the Colorado (Low) Desert. The wind through the pass is a constant current of air sweeping from the west to east. Based on the analyses of aerometric data from surface stations, balloon measurements, and aircraft measurements, several studies have concluded that the Low Desert is subject to the intrusion of pollution from the coastal area of Southern California. The Soledad Canyon and the Cajon Pass connect the High Desert to the Los Angeles Basin. The High Desert is the western portion of the Mojave Desert located north of the San Gabriel and San Bernardino Mountains. Tracer trajectory routes show that the northwest part of the South Coast Air Basin feeds into the Soledad Canyon while the southern part of the South Coast Air Basin feeds into the Cajon Pass.

Finally, ARB studies indicate that pollutant transport also occurs between the South Coast Air Basin and the South Central Coast Air Basin. The South Central Coast Air Basin includes San Luis Obispo, Santa Barbara, and Ventura Counties. Due to the interaction of the topography and meteorology, the wind flows between these two Air Basins are some of the most complex in California. Pollutant transport can take place in either direction, from the southern portion of the South Central Coast Air Basin to the South Coast Air Basin. There are two major pollutant transport routes between these two Air Basins. One is overland between the San Fernando Valley and



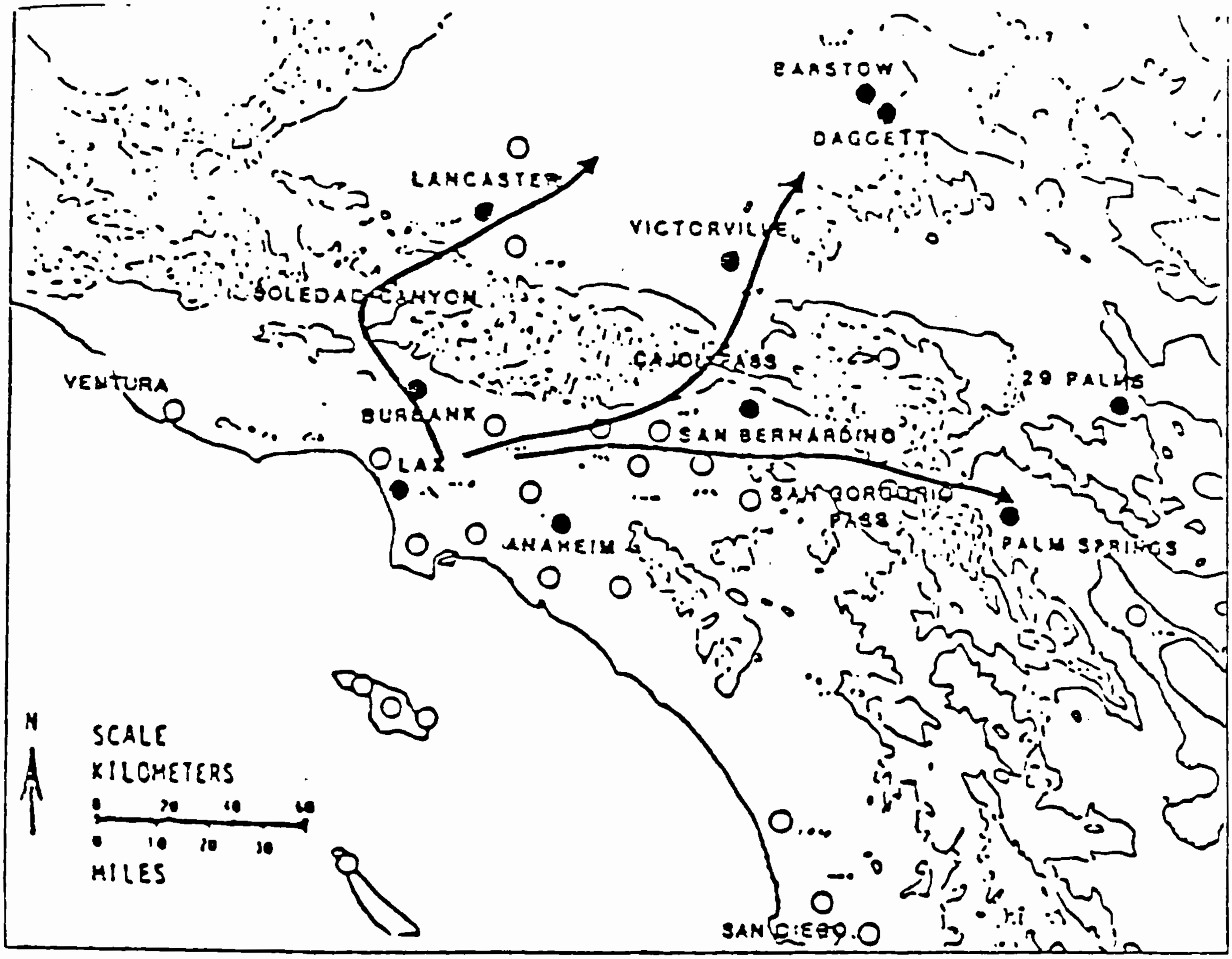
Sources: U.S. Weather Bureau and Scripps Institution of Oceanography



Examples of Trajectories
(from Bell, 1960)

Figure 30

Interbasin Transport Corridors Through the Mountain Passes Between the South Coast Air Basin and the Southeast Desert Air Basin



Interbasin Transport Corridors Through the Mountain Passes Between the South Coast Air Basin and the Southeast Desert Air Basin (Soledad Canyon 3,300 ft; Cajon Pass 4,200 ft; San Gorgonio Pass 2,300 ft) (from Smith et al. 1984) eastern Ventura County. The second transport route is over water across the Santa Monica Bay.

Southeast Desert Air Basin

In addition to transport from the South Coast Air Basin, several ARB studies also indicate that pollutant transport occurs from the San Joaquin Valley Air Basin to the Southeast Desert Air Basin. In the summertime, air frequently enters the San Joaquin Valley from the San Francisco Bay Area and flows in a southeasterly direction down the valley toward the Tehachapi Mountains. Some of this air and the pollution carried with it moves through the Tehachapi Pass into the Mojave Desert. The ARB concludes that the increased growth in the southern portion of the San Joaquin Valley will substantially impact the air quality in the Mojave Desert due to this transport corridor.

Finally, the ARB studies suggest that pollutant transport also occurs from San Diego County into the Southeast Desert Air Basin. A major potential pollutant transport corridor is through the In Ko Pah Gorge of the Jacumba Mountains in San Diego County into the Southeast Desert Air Basin.

E. Global Warming

Global warming is the name given to the projected increase in worldwide average temperatures as a result of an increase in the "greenhouse effect", due to the increased concentration of carbon dioxide (CO_2) and several trace gases in the atmosphere. Like the glass in a greenhouse, these gases are transparent to visible light, but absorb energy transmitted to the infraced spectrum. Light from the sun is thus transmitted through to the earth's surface, but infrared radiation from the earth's surface is absorbed near the atmosphere, rather than radiating back to space.

Although scientific opinion is not unanimous, there is fairly general agreement that the increasing concentration of infrared absorbing gases in the atmosphere is likely to lead to a measurable increase in average global surface temperature by the middle of the next century. The impacts of this increase on California could include a decrease in water supplies, increased electric demand for cooling, a rise in ocean level which would imperil wetlands and shorelines, increased air pollution, and adverse impacts on California's economy.[5]

Significant greenhouse gases in addition to CO_2 include methane, ozone, nitrous oxide, and various chlorofluorocarbon (CFC) species. Carbon monoxide (CO) and non-methane hydrocarbons (NMHC) are also important through their effects on atmospheric chemistry. These species react in the atmosphere to form ozone, and compete for OH radicals, which are responsible for degrading methane. Although nitrous oxide and the CFC species are present in the atmosphere in much smaller concentrations than CO_2, ozone, and methane, their infrared absorption per molecule is thousands of times greater, so that they have a major impact overall. One much-cited study by Ramanathan et al.[6] projects a global temperature increase of 1.54°C, by 2030. The estimated contributions of various gases to this phenomenon are shown in Figure 31. The total warming due directly to the various CFC species was projected to be 0.36°C, with another increase of 0.08°C due to depletion of stratospheric ozone (also due to CFCs). The total CFC contribution is thus 0.44°C -- the second largest effect after CO_2, accounting for 29% of the projected warming.

A complete inventory of greenhouse gas emissions in California is not yet available. The California Energy Commission[1] has estimated the breakdown of carbon emissions in California as shown in Figure 32. CFC emissions in California are also significant -- one estimate cited by the Energy Commission suggests that California emits 5% of total global CFC emissions. Major emissions of CFCs result from their use as cleaning solvents in the computer and aerospace industries, and as blowing agents in the production of foam insulation and packaging material. CFCs are also used extensively as working fluids in refrigeration and air-conditioning systems, but this does not result in their emission, except in the case of leakage, or when the systems are scrapped or recharged without salvaging the refrigerant.

6. REGULATORY SETTING

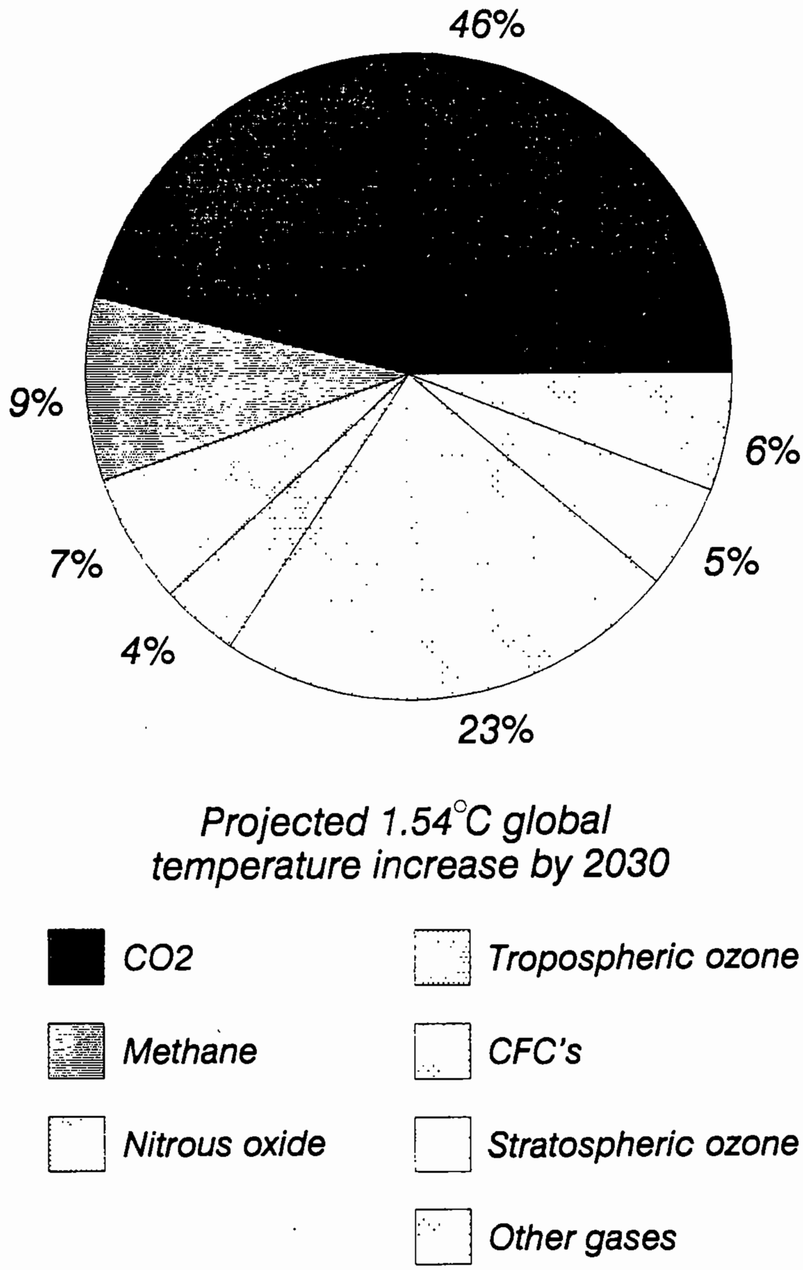
A. Federal Prevention of Significant Deterioration Program

The U.S. Environmental Protection Agency has promulgated Prevention of Significant Deterioration regulations for areas that have achieved the National Ambient Air Quality Standards. The Prevention of Significant Deterioration program allows new sources to be constructed or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas). The South Coast Air Quality Management District has applied for delegation of authority to implement the Prevention of Significant Deterioration program, but the request has not been approved by the Environmental Protection Agency. Thus, the Prevention of Significant Deterioration review, if applicable, would be conducted by the Environmental Protection Agency. The five principal areas of the Prevention of Significant Deterioration program are as follows:

- applicability;
- best available control technology;
- pre-construction monitoring;
- increments analysis;
- air quality impact analysis.

Figure 31

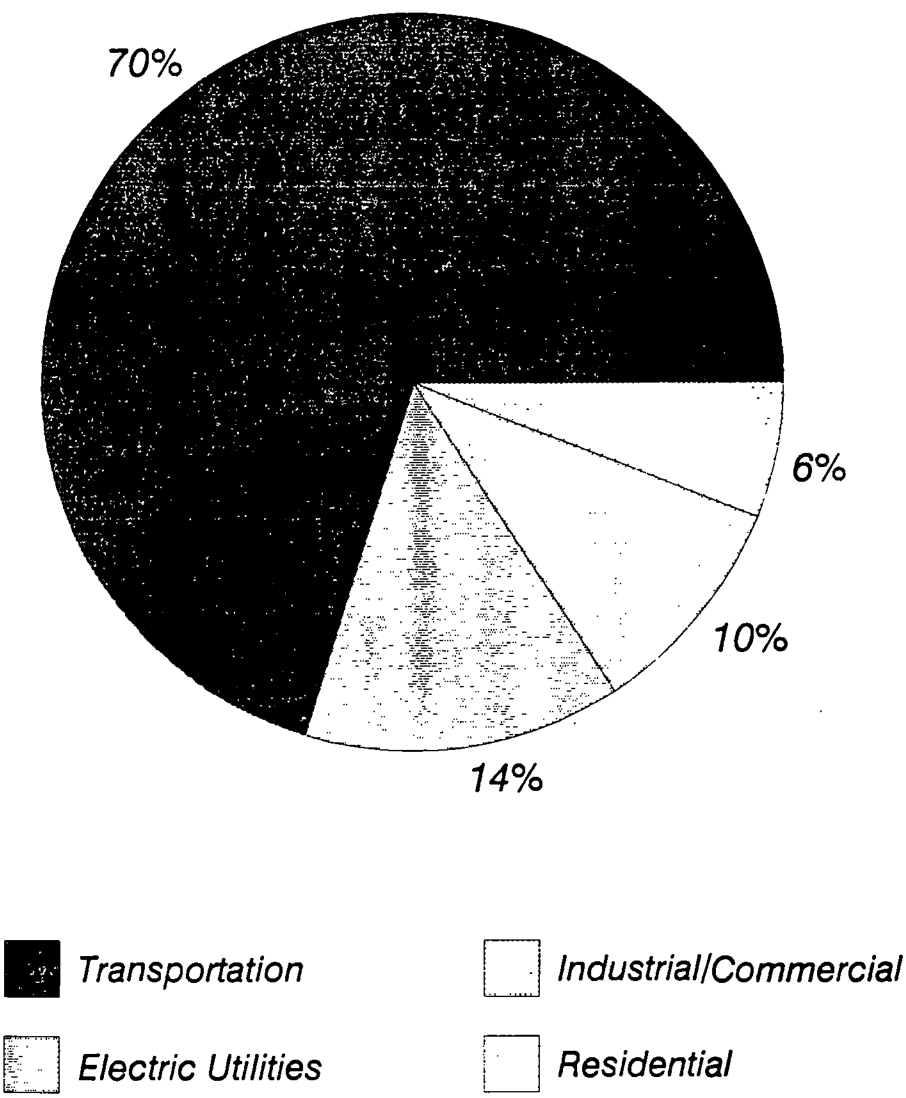
Contribution of Greenhouse Gases to Global Temperature Changes



V. Ramanathan, et al.
Trace Gas Trends and Their Potential Role in Climate Change
J. Geophys. Res., June 20, 1985.

Figure 32

Breakdown of Carbon Emissions in California



California Energy Commission
The Impacts of Global Warming: Interim Report
Sacramento, CA June 1989

The Prevention of Significant Deterioration requirements apply on a pollutant-specific basis to any project which is a new major stationary source or a major modification to an existing stationary source. (These terms are defined in federal regulations.) This determination is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the same location over the last five years.

B. Federal New Source Performance Standards

The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those which have a National Ambient Air Quality Standard and their precursors) from such sources. The New Source Performance Standards apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. Recordkeeping, reporting and monitoring requirements are generally provided for each pollutant from each subject source, and reports must be regularly submitted to the reviewing agency. The New Source Performance Standards that could apply to reconstruction or new installations associated with the project include the standard for Non-metallic Mineral Processing Plants.

The South Coast Air Quality Management District has adopted the New Source Performance Standards by reference in its Regulation IX and enforces them as part of its permitting process. New installations of emissions controls or changes in existing operations or equipment that constitute a "modification" as defined in federal regulations could be subject to the New Source Performance Standards. Generally, however, the South Coast Air Quality Management District's New Source Review rules and source-specific rules will result in more stringent requirements than the New Source Performance Standards.

National Emissions Standards for Hazardous Air Pollutants

The National Emissions Standards for Hazardous Air Pollutants are source-specific federal regulations, limiting the allowable emissions of hazardous air pollutants from such sources. Unlike criteria air pollutants, hazardous air pollutants are those which do not have a National Ambient Air Quality Standard but have been identified by the Environmental Protection Agency to cause or contribute to the adverse health effects of air pollution.

Administration of the hazardous air pollutants program has been delegated to the South Coast Air Quality Management District, which has referenced the federal standards in its Regulation X. Applicability of these standards is generally based on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. Hazardous air pollutant standards that could apply to the project include:

- o Benzene
- o Vinyl Chloride
- o Asbestos

C. California Clean Air Act

AB 2595, the "California Clean Air Act" (Act) was enacted by the California Legislature and became law on January 1, 1989. The Act requires the local air pollution control districts to attain and maintain the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for the local districts and the California Air Resources Board. The most immediate milestone is the requirement that local districts submit air quality plans to the Air Resources Board.

The plans are required to demonstrate attainment of the state ambient air quality standards, and specifically, the plans must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and their precursors) in a given district. A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand their vehicle inspection and maintenance program. There is no immediate impact on the project, because the Act directly affects only the local districts. However, future district regulations developed and adopted to achieve the requirements of the Act may apply to the proposed project and affect future plans for expansion or modification.

D. Local New Source Review Requirements

The South Coast Air Quality Management District conducts a pre-construction review program for all new or modified sources of air pollution. This program, which is known as New Source Review, is prescribed in the District's Regulation XIII. The New Source Review program contains three principal elements:

- o best available control technology;
- o emissions offsets;
- o air quality impact analysis.

Best Available Control Technology and emissions offsets are for all new emissions sources or modifications of existing sources. The New Source Review regulation also requires that a project neither cause nor contribute measurably to a violation of any state or National Ambient Air Quality Standard.

The South Coast Air Quality Management District has also adopted additional rules that prescribe requirements for review of new or modified sources of toxic air contaminants.

E. Other Local Regulatory Requirements

As required by the federal Clean Air Act, plans that demonstrate attainment must be developed for those areas that have not attained the National Ambient Air Quality Standards. As part of these plans, the local air pollution control and air quality management districts have developed regulations limiting emissions from specific sources. The South Coast Air Quality Management District has adopted a variety of regulations that limit the emissions of various pollutants from many types of sources in the District. These rules are collectively known as "prohibitory rules", because they prohibit the construction or operation of a source of pollution that would violate specific emissions limits. The South Coast Air Quality Management District has adopted general and source-specific rules and regulations that apply to this project, which include the following:

Rule 401 (Visible Emissions) - Applies to emissions of particulate matter from any stationary sources. As applied to the proposed project, this rule would apply to emissions from landfill gas flares and tailings processing equipment to 20% opacity.

Rule 403 (Fugitive Dust) - Applies to emissions of fugitive dust from any transport, handling, construction, or storage activity. As applied to the proposed project, this rule could prohibit the emission of visible plumes of particulate matter beyond the project boundaries from haul road use and the excavation and placement of liner and cover material.

Rule 404 (Particulate Matter - Concentration) - Applies to emissions of particulate matter from landfill gas flares. As applied to the proposed project, this rule would limit the concentration of particulate matter in the flare exhaust gases to that dictated in a published table.

Rule 405 (Solid Particulate Matter - Weight) - Applies to emission of particulate matter from tailing processing equipment. As applied to the proposed project, this rule would limit the mass emission rate of particulate matter from stationary equipment used to crush, size, or blend tailing materials used in the production of pit liner or waste cover products to that dictated in a published table.

Rule 407 (Liquid and Gaseous Air Contaminants) and Rule 409 (Combustion Contaminants) - Apply to emissions of carbon monoxide and sulfur dioxide from landfill gas flares. As applied to the proposed project, these rules would limit emissions of carbon monoxide and sulfur dioxide from the flares to 2000 ppm and 500 ppm, respectively.

Rule 431.1 (Sulfur Content of Gaseous Fuels) - Applies to the sulfur content of commercial gaseous fuel. As applied to the proposed project, this rule would limit the content of sulfur in landfill gas to 250 ppm if such gas were to be processed and sold for offsite use.

Rule 1150.1 - This rule requires the installation of a landfill gas collection system. To comply with this rule, horizontal networks of perforated pipe will be installed at periodic elevations in the landfill as deposited waste rises from the bottom of the pit. These networks will be connected to vertical wells which will be connected to headers and a main trunk line delivering landfill gas to the flare station. Large centrifugal fans at the flare station, or intermediate between the landfill and the station, will generate the slight vacuum needed to induce the flow of landfill gas into the collection system. This vacuum will be carefully regulated. If the vacuum is too high, air will be drawn through the landfill cover into the collection system, diluting the landfill gas concentration and requiring auxiliary fuel to maintain combustion conditions at the flares. With too little pressure, excess landfill gas will escape the landfill and be emitted to the atmosphere without being treated by the flares. At optimum settings, it is estimated that 80% of the landfill gas will be vented to the flare station with the remaining 20% escaping through the landfill cover. These optimum flows will be maintained by regulation of the number of operating fans. A control system sensing the oxygen content in the delivered gas and the methane content in gas probes at the surface and near the edges of the landfill will be used to made flow adjustments.

At the flare station, large cylindrical drums will be used to combust the landfill gas. Gas supplied by the centrifugal fans will be fed to a series of identical flares. Each flare will be operated at a fixed gas flowrate. As the flow of gas from the landfill varies, the number of flares operated will be varied. Each flare will be equipped with a diffusion grid burner consisting of a row of burner nozzles installed in each of a series of parallel headers. The remainder of each flare will consist of a cylindrical shell with an open top rising above the diffusion burner. A sensor and feed system in the main flare supply pipe will measure the concentration of combustible gas and add auxiliary propane fuel if the fuel value of the landfill gas falls below the limit of ignitability.

Rule 1401 - This rule prohibits the construction of a new or modified facility which causes health risks in excess of specific limits contained in the rule. This rule would apply to increased cancer risks imposed by exposure to nearby residents from emissions of carcinogenic hydrocarbons emitted in trace concentrations in landfill gas from the landfill surface and from the landfill gas flares. The cumulative risk from these exposures could not exceed a level which would cause an increase in maximum individual cancer risk of 1.0×10^{-6} over a seventy year lifespan. If a source uses control technology selected as "toxic best available control technology" by the District, then the allowable increase in maximum individual cancer risk would be 1.0×10^{-5}. Each source desiring to be permitted under the second risk standard would additionally be required to demonstrate that within the source's downwind impact area, the cumulative number of increased cancer cases would not statistically average 0.5 or more.

F. South Coast Air Quality Management Plan

In March 1989, the South Coast Air Quality Management District adopted an Air Quality Management Plan in accordance with federal Clean Air Act requirements, which mandate that areas not attaining ambient air quality standards prepare plans demonstrating attainment by December 31, 1987, or the earliest date practicable. Because the District has such a severe air quality problem, the earliest date by which the District has projected attainment with the federal ozone standard is 2010.

The attainment strategy relies on three "tiers" of regulatory proposals, each addressing emissions reductions from stationary sources, measures pertaining to the motor vehicle sector, and impacts from population growth in the region. The proposed measures are categorized into each tier depending upon how soon they can be implemented.

Tier I proposals are based on technology and management practices that are currently available or can be implemented within the next five years. The Tier I measures are aimed at reducing the emissions from industrial surface coating and solvent use, consumer products, and combustion-associated processes; adopting rules that apply to small, currently unregulated sources and processes; and increasing energy conservation. Tier I control measures affecting the transportation sector are focused on reducing vehicle use and imposing stricter emissions standards for off-road vehicles (railroads, boats and ships, and aircraft).

Tier II consists of goals to be achieved through significant advances in current technology and strict regulatory enforcement. Specific regulations have not yet been developed as they have for Tier I, but goals and strategies for achieving those goals have been established. It is expected that the Tier II measures will be implemented in the next ten to fifteen years. For many types of stationary sources, the goal is to minimize existing emissions, along with potential emission growth, to achieve a 50 percent reduction of the emissions remaining after the Tier I controls are implemented. The goals for the transportation sector are more specific and rely heavily on using "alternative" fuels and "low-emitting" vehicles.

The Tier III category is the most optimistic of the three categories being proposed, depending heavily upon breakthroughs in process technology and pollution control to achieve the emission reductions necessary to attain the federal ozone standard. Strategies include non-reactive solvents for surface coatings and solvent use and "extremely low-emitting" vehicles.

PART II. IMPACTS AND MITIGATION MEASURES FOR THE PROPOSED ACTION AND ALTERNATIVES

1. OVERVIEW OF THE ANALYTICAL APPROACH

Air quality impacts associated with the project are due to emissions from the following sources:

- Construction operations
- Transfer stations
- Solid waste transport
- On-site material handling (except fugitive dust)
- Landfill gas generation and combustion
- Fugitive dust

Emissions from each of the categories of sources were estimated on both a maximum daily and annual basis.

Worst case emission rates were used to avoid underestimating impacts from the project. These emission rates were chosen as representative of currently permittable technology and from test data from similar units in operation. For the train haul scenario, for example, current fuel use and emission data for the Southern Pacific locomotive fleet were obtained, and grade-specific factors were generated through information received from Southern Pacific. Manufacturer test data were gathered from General Electric's files for the Kaiser locomotives, and specific fuel factors were computed from analyses of the grade profile from Ferrum Junction to Eagle Mountain. For the landfill gas flares, emission and equipment data from seven landfills tested by the South Coast Air Quality Management District were used to determine average emission rates for similar equipment design. Within the range of dust factors published by the Environmental Protection Agency in AP-42 and various research reports, values at the high end of those considered representative of on-site material and proposed processes were chosen.

In addition to estimating the emissions from the project, an assessment was made of the impact on ambient air quality which would result from these emissions. The maximum ground level impacts were determined for on-site operations. In addition, for the rail haul of waste, an at-grade crossing of street traffic in a residential area was evaluated and maximum ground level concentrations were determined.

To further maximize potential impacts, receptor sites closest to each source, or nearest the maximum groundlevel impact site, were selected for analysis. For the train haul scenario, the nearest receptor was represented as a hypothetical residence lying immediately outside the narrowest right-of-way width found along the line between Los Angeles and Ferrum Junction. For the on-site sources, the target receptor is selected as the one closest to the project's southern boundary.

Because digitized wind data are not available for the project site, worse case impact conditions were simulated by varying wind speeds across the spectrum found in this region and at a series of directions around the compass. Wind speeds and atmospheric stability modeling combinations, as specified by the Environmental Protection Agency, were used to determine the highest impacts irrespective of direction. Then, these conditions were combined with the wind directions blowing from project sources toward identified residences to estimate the highest concentrations to which members of the public might reasonably be exposed as a result of operation of the project.

The screening methodology outlined above estimates worse case concentrations for one-hour periods. However, the analysis of longer term averages is necessary as many of the state and federal ambient air quality standards are designed to be measured over these timeframes. In this type of screening analysis, longer term averages are computed from highest one-hour concentrations through the use of recommended Environmental Protection Agency conversion factors. These conversion factors are:

1-hour:	1.00
3-hour:	0.90
8-hour:	0.70
24-hour:	0.40
annual:	0.10

2. SELECTION OF AIR QUALITY MODELS

Air quality models are computer simulations which translate source-specific emission information into impacts on ambient air quality over local or regional areas. Several different approved models can be used to make this translation. Those which have been considered for the analysis are ISCST, COMPLEX I, PAL, and SHORTZ.

ISCST

The Industrial Source Complex (ISC) model is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. This model can account for settling and dry deposition of particulates; downwash; point, area, line, and volume sources; plume rise as a function of downwind distance; separation of point sources; and limited terrain adjustment. The model cannot, however, accept receptor elevations exceeding the stack height, limiting its practical application to flat terrain sites. Since a critical receptor area for this project is the Class I area (Joshua Tree National Monument) rising above and to the north of the project, the ISC model was not used in the impact analysis.

COMPLEX I

The COMPLEX I model is a multiple point source steady-state Gaussian plume model which is recommended for use with complex (varying elevation) terrain. This model can use hourly meteorological data and produce output concentrations averaged over a number of time periods. The model cannot accommodate area and line source input data, and thus cannot account for all on-site sources associated with the project. For this reason, COMPLEX I was not used in the impact analysis.

PAL

The Point, Area, Line (PAL) source model is a short-term steady-state Gaussian plume model. The model is designed to accommodate combinations of point, area, and line sources for such projects as shopping centers and airports. The model has unique capabilities in handling curved line sources, but does not contain an algorithm for computing concentrations in complex terrain. Because of its inability to model impacts in varying topography such as is found at the project site, PAL was not used in the impact analysis.

SHORTZ

The SHORTZ model is a steady-state Gaussian plume model for use in flat or complex terrain. As designed by the Environmental Protection Agency, the model can accommodate point and area sources and produce output concentrations averaged over a variety of timeframes. As modified by Radian Corporation, a version of the model can also accommodate line sources. Line sources include truck and train traffic, and represent a large component of the project's emissions. In its revised form, the model has successfully completed qualifying tests and has been approved for use by the Environmental Protection Agency as an alternative methodology for computing concentrations in complex terrain. Because the revised version of SHORTZ contains those features needed in modeling impacts from all on-site project sources in flat and complex terrain, SHORTZ was selected and used in the impact analysis.

3. DISCUSSION OF SIGNIFICANCE CRITERIA

In attempting to evaluate the significance of air quality impacts of proposed projects, it is difficult to identify a single measure of significance. Some people believe that percentage changes in emissions are most critical, while others believe that changes in ambient concentrations are appropriate measures. Most air quality regulations are based on emissions, rather than ambient concentrations, due to uncertainties in the accuracy of available modeling techniques.

To assist in evaluating the impacts described in the preceding section, we should identify tools used by local, state and federal air quality agencies to determine whether a project's air quality impacts are significant. In addition, we should discuss other measurements of significance which have been suggested in other projects. The impacts of each of the project alternatives discussed above should then be compared with each of these measures.

Measures of significance for air quality impacts can generally be separated into four major categories:

- those used for the evaluation of industrial sources of pollution, prior to issuing permits to construct or operate, which rely on the comparison of potential emissions increases to established emissions thresholds;
- those used for the evaluation of industrial sources of pollution which rely on the comparison of potential increases in ambient pollutant concentrations to established "significance" thresholds;
- the limits of detection or reportability of ambient concentrations; and
- measures used in areas with severe air quality problems.

Each of these categories is discussed in more detail in the following sections.

Emissions Based Measures

Industrial facilities in California are required to undergo an extensive air quality analysis, known as "new source review", prior to being granted approval for construction. The new source review programs in California are carried out by local air pollution control districts.

The regulations which implement these new source review programs contain a number of thresholds which trigger various requirements for project applicants. These thresholds are expressed as emissions limitations (pounds per hour or tons per year). The thresholds vary from district to district, with the South Coast AQMD having the most stringent thresholds. One could construe these thresholds as assessments of the significance of a project's impacts, since a project with emissions below these levels is exempted from all (or a portion) of the review.

Therefore, one potential measure of the significance of emissions increases from the proposed project is the applicable new source review thresholds in the air quality district in which the project is located.

Concentration Based Measures

The federal Environmental Protection Agency administers a program under which proposed new and modified sources in clean air areas are reviewed for their impact on air quality before being granted permits to construct. This program, known as the "prevention of significant deterioration," or PSD, program, uses ambient concentration-based measures as well as emission thresholds to determine whether an emissions increase is significant. The concentration-based assessment of significance is used as a screening technique to determine the applicability of additional preconstruction data gathering and analysis requirements. The ambient concentration levels used by the EPA to measure significance could also be applied to modeled increases in ambient pollutant levels to decide whether the impacts of the project are significant.

Limits of Detection and Measurement Accuracy

A third category of measures of significance has to do with the ability of regulatory agencies to detect changes in concentrations of pollutants in the ambient air. This ability is a function of the limits of detection and the accuracy of the system used to analyze the air. The limit of detection for most pollutants is extremely small. Advances in analytical technology allow lower and lower concentrations of pollutants to be measured. In general, the more serious constraint has to do with the accuracy of the measurements.

The California Air Resources Board conducts periodic audits of the ambient air quality monitoring network throughout the state. The Board has established guidelines for the accuracy of these analyzers. If an analyzer is found to be operating outside of ARB's 10% limit for accuracy, an "advisory warning" is issued and a more thorough check is made of the analyzer's calibration data. If an analyzer is found to be operating outside of ARB's 15% limit for accuracy, the data collected by that analyzer are rejected unless the discrepancy can be explained and corrected.

In ARB's most recent published results of their field audits, they listed the average accuracy estimates for ambient monitors in California. While these accuracy tests were conducted at a variety of different concentrations, their use is most critical at or near the level of the ambient air quality standards. Consequently, one potential measure of "significance" for air quality impacts would be whether the difference in pollutant concentrations attributable to a project is above or below the accuracy of the average analyzer as estimated at the air quality standard for that pollutant.

A second, related measure has to do with the degree of precision to which the Air Resources Board maintains and reports ambient air quality concentrations. ARB selects their reporting precision based on a subjective evaluation of the precision of the analyzers, the accuracy of the analyzers, and the level of precision to which the ambient air quality standard is expressed. Thus, another measure of significance of air quality impacts would be whether the difference in pollutant concentrations attributable to the merger would change a number reported by the ARB.

Other Measures of Significance

One measure which has been suggested for use in areas with particularly difficult air quality problems is known as "the one molecule theory". Under this approach, it is assumed that because the existing air quality problem in a region is so severe, any increase in emissions or pollutant concentrations, even a single molecule, would constitute a significant increase. The purpose of this approach is generally to require mitigation of all projects which would result in any increase in emissions.

However, this approach tends to break down when evaluating the impacts of extremely small projects. For example, the addition of a stop sign at a traffic intersection would result in a small increase in emissions (and localized concentrations) of carbon monoxide. While there may be mitigation measures available which could reduce carbon monoxide emissions at another nearby location, there would always be an increase of at least one molecule of carbon monoxide right where the new stop sign is located. Under this example, if the one molecule theory were rigorously applied, one would have to conclude that the addition of the stop sign resulted in a significant impact and that this significant impact could not be mitigated.

A more practical application of the one molecule theory is to use it to determine <u>whether</u> mitigation should be required for a project in areas with severe air quality problems, but to rely on other measures of significance (or simply judgment) to evaluate the benefits of the mitigation measures.

Applicable regulations of the South Coast Air Quality Management District and the federal Environmental Protection Agency were reviewed, along with reports published by the California Air Resources Board, in order to develop the significance criteria used to evaluate the Eagle Mountain project. The selected criteria are shown in Tables 14 - 18 for ozone, oxides of nitrogen, carbon monoxide, sulfur dioxide, and fine particulate matter, respectively.

These criteria were applied to emissions from the "in basin" alternative, which was treated as a no project alternative, and to the Eagle Mountain and Alternate Desert Site alternatives. In addition, the latter cases were compared with emissions from the no project alternative, and the incremental effects were evaluated.

Table 14

Eagle Mountain Project
Measures of Significance for Hydrocarbons/Ozone

Agency	Level	Abbreviation	Comment
Hydrocarbon and NOx Emissions Based Measures - Industrial Sources			
South Coast AQMD	0 lbs/day	AQMD BACT	level above which BACT is reqd. for new/mod facility
South Coast AQMD	75 lbs/day	AQMD offsets	level above which offsets are required
South Coast AQMD	100 tons/year	AQMD major NSR	definition of major stationary source (NSR)
South Coast AQMD	25 tons/year	AQMD major PSD	definition of major stationary source (PSD)
South Coast AQMD	25 tons/year	AQMD sig incr PSD	definition of significant emission increase (PSD)
EPA	100 tons/year	EPA major source	definition of major stationary source
EPA	40 tons/year	EPA major mod	definition of major modification
Ozone Measurement Accuracy and Reporting Precision			
CARB	0.54 pphm	ARB accuracy	ARB measured accuracy of 6.0% times 9 pphm standard
CARB	1 pphm	ARB reporting	precision to which ARB reports concentrations
Other Measures			
none	0 lbs/day	Zero molecule	the zero molecule theory (see text)

Table 15

Eagle Mountain Project
Measures of Significance for Oxides of Nitrogen

Agency	Level	Abbreviation	Comment
Emissions Based Measures - Industrial Sources			
South Coast AQMD	0 lbs/day	AQMD BACT	level above which BACT is reqd. for new/mod facility
South Coast AQMD	100 lbs/day	AQMD offsets	level above which offsets are required
South Coast AQMD	100 tons/year	AQMD major NSR	definition of major stationary source (NSR)
South Coast AQMD	25 tons/year	AQMD major PSD	definition of major stationary source (PSD)
South Coast AQMD	25 tons/year	AQMD sig incr PSD	definition of significant emission increase (PSD)
EPA	100 tons/year	EPA major source	definition of major stationary source
EPA	40 tons/year	EPA major mod	definition of major modification
Concentration Based Measures - Industrial Sources			
South Coast AQMD	10 ug/m3 ann	AQMD Class I ann	allowable increment for Class I areas (parks)
EPA	10 ug/m3 ann	EPA Class I ann	significant impact on a Class I area
EPA	14 ug/m3 ann	EPA de minimus ann	level below which ambient monitoring is not required
EPA	1 ug/m3 ann	EPA sig ann	significant air quality impact in nonattainment areas
Measurement Accuracy and Reporting Precision			
CARB	0.18 pphm 1-hr	ARB accuracy 1h	ARB measured accuracy of 0.7% times 25 pphm standard
CARB	1 pphm 1-hr	ARB report 1h	precision to which ARB reports concentrations
CARB	0.1 pphm ann	ARB report ann	precision to which ARB reports concentrations
Other Measures			
none	0 lbs/day	Zero molecule	the zero molecule theory (see text)

Table 16

Eagle Mountain Project
Measures of Significance for Carbon Monoxide

Agency	Level	Abbreviation	Comment
Emissions Based Measures - Industrial Sources			
South Coast AQMD	0 lb/day	AQMD BACT	level above which BACT is reqd. for new/mod facility
South Coast AQMD	550 lbs/day	AQMD offset	level above which offsets are required
South Coast AQMD	100 tons/year	AQMD major NSR	definition of major stationary source (NSR)
South Coast AQMD	25 tons/year	AQMD major PSD	definition of major stationary source (PSD)
South Coast AQMD	25 tons/year	AQMD sig incr PSD	definition of significant emission increase (PSD)
EPA	100 tons/year	EPA major source	definition of major stationary source
EPA	100 tons/year	EPA major mod	definition of major modification
Concentration Based Measures - Industrial Sources			
EPA	1 ug/m3 24-hr	EPA Class I 24h	significant impact on a Class I area
EPA	575 ug/m3 8-hr	EPA de minimus 8h	level below which ambient monitoring is not required
EPA	500 ug/m3 8-hr	EPA sig 8h	significant impact in nonattainment areas
EPA	2000 ug/m3 1-hr	EPA sig 1h	significant impact in nonattainment areas
Measurement Accuracy and Reporting Precision			
CARB	0.02 ppm 1-hr	ARB accuracy 1h	ARB measured accuracy of 0.1% times 20 ppm standard
CARB	1 ppm 1-hr	ARB report 1h	precision to which ARB reports concentrations
CARB	0.1 ppm 8-hr	ARB report 8h	precision to which ARB reports concentrations
Other Measures			
none	0 lbs/day	Zero molecule	the zero molecule theory (see text)

Table 17

Eagle Mountain Project
Measures of Significance for Sulfur Dioxide

Agency	Level	Abbreviation	Comment
Emissions Based Measures - Industrial Sources			
South Coast AQMD	0 lbs/day	AQMD BACT	level above which BACt is reqd. for new/mod facility
South Coast AQMD	150 lbs/day	AQMD offsets	level above which offsets are required
South Coast AQMD	100 tons/year	AQMD major NSR	definition of major stationary source (NSR)
South Coast AQMD	25 tons/year	AQMD major PSD	definition of major stationary source (PSD)
South Coast AQMD	25 tons/year	AQMD sig incr PSD	definition of significant emission increase (PSD)
EPA	100 tons/year	EPA major source	definition of major stationary source
EPA	40 tons/year	EPA major mod	definition of major modification
Concentration Based Measures - Industrial Sources			
South Coast AQMD	2 ug/m3 ann	AQMD Class I ann	allowable increment for Class I areas (parks)
South Coast AQMD	5 ug/m3 24-hr	AQMD Class I 24h	allowable increment for Class I areas (parks)
South Coast AQMD	25 ug/m3 3-hr	AQMD Class I 3h	allowable increment for Class I areas (parks)
EPA	2 ug/m3 ann	EPA Class I ann	allowable increment for Class I areas (parks)
EPA	5 ug/m3 24-hr	EPA Class I 24h	allowable increment for Class I areas (parks)
EPA	25 ug/m3 3-hr	EPA Class I 3h	allowable increment for Class I areas (parks)
EPA	13 ug/m3 24-hr	EPA de minimus 24h	level below which ambient monitoring is not required
EPA	1 ug/m3 ann	EPA sig ann	significant air quality impact in nonattainment areas
EPA	5 ug/m3 24-hr	EPA sig 24h	significant air quality impact in nonattainment areas
EPA	25 ug/m3 3-hr	EPA sig 3h	significant air quality impact in nonattainment areas
Measurement Accuracy and Reporting Precision			
CARB	0.33 pphm 1-hr	ARB accuracy 1h	ARB measured accuracy of 1.3% times 25 pphm standard
CARB	1 pphm 1-hr	ARB reporting 1h	precision to which ARB reports concentrations
Other Measures			
none	0 lbs/day	Zero molecule	the zero molecule theory (see text)

Table 18

Eagle Mountain Project
Measures of Significance for Fine Particulates (PM10)

Agency	Level	Abbreviation	Comment
Emissions Based Measures - Industrial Sources			
South Coast AQMD	0 lbs/day	AQMD BACT	level above which BACT is reqd. for new/mod facility
South Coast AQMD	150 lbs/day	AQMD offsets	level above which offsets are required
South Coast AQMD	100 ton/year	AQMD major NSR	definition of major stationary source (NSR)
South Coast AQMD	25 tons/day	AQMD major PSD	definition of major stationary source (PSD)
South Coast AQMD	15 ton/year	AQMD sig incr PSD	definition of significant emission increase (PSD)
EPA	100 tons/year	EPA major source	definition of major stationary source
EPA	15 tons/year	EPA major mod	definition of major modification
Concentration Based Measures - Industrial Sources			
South Coast AQMD	5 ug/m3 ann	AQMD Class I ann	allowable increment for Class I areas (parks)
South Coast AQMD	10 ug/m3 24-hr	AQMD Class I 24h	allowable increment for Class I areas (parks)
EPA	5 ug/m3 ann	EPA Class I ann	allowable increment for Class I areas (parks)
EPA	10 ug/m3 24-hr	EPA Class I 24h	allowable increment for Class I areas (parks)
EPA	10 ug/m3 24-hr	EPA de minimus 24h	level below which ambient monitoring is not required
EPA	1 ug/m3 ann	EPA sig ann	definition of a significant air quality impact
EPA	5 ug/m3 24-hr	EPA sig 24h	definition of a significant air quality impact
Measurement Accuracy and Reporting Precision			
CARB	1.2 ug/m3 24-hr	ARB accuracy 24h	ARB measured accuracy of 2.4% times 50 ug/m3 std.
CARB	1 ug/m3 24-hr	ARB reporting 24h	precision to which ARB reports concentrations
CARB	0.1 ug/m3 ann	ARB reporting ann	precision to which ARB reports concentrations
Other Measures			
none	0 lbs/day	Zero molecule	the zero molecule theory (see text)

4. PROJECT IMPACTS

A. Proposed Action

1) Emissions Impacts

Emissions from the Proposed Action will be associated with a number of activities. These activities will occur both offsite, such as the operation of urban transfer stations, and on-site, including all of the operations at the Eagle Mountain site. They will involve both stationary sources, such as the landfill gas flares, and mobile equipment, such as the trains hauling waste. By emission type, project sources can be grouped into four classes: motor vehicles, fugitive dust sources, fugitive vapor sources, and stationary combustion sources. Motor vehicles include train locomotives, on-highway haul trucks, and off-highway highway equipment. Fugitive dust sources include short-term construction activities, landfill road use, mine tailing reclamation, and solid waste covering. Fugitive vapor sources include the landfill, and stationary combustion sources include the landfill gas flares.

Motor vehicles will generate "tailpipe" emissions and, in the case of on-site vehicles, fugitive dust from unpaved roads and cover material handling. Processing of daily cover material will produce particulate emissions as ore tailing are reclaimed by screening and crushing. As the refuse begins to decompose, gas will be generated by the anaerobic activity in the landfill. The gas will consist primarily of methane and carbon dioxide with trace concentrations of other substances either produced by the bacterial activity or evaporated from materials disposed of in the landfill. The gas will be collected through a series of underground pipes and will be disposed of by flaring. The burning of the landfill gas in flares will result in the production of combustion emissions. Each of these sources is discussed in more detail below.

Construction Operations

Temporary emissions will be produced during the construction of project facilities. At both on-site and offsite locations, fugitive dust and construction equipment exhaust will be generated. As these emissions will be temporary and, for fugitive dust, readily controllable, they are not considered to be significant.

Some new transfer stations processing and shipping solid waste may be constructed in the South Coast Air Basin. These sites may require demolition of existing structures, excavation for new foundations, and disturbance of soil areas during construction. Fugitive dust and exhaust emissions from construction equipment will be generated. Soil that is carried out of construction sites and dropped onto paved roads will generate fugitive dust as it is pulverized by vehicle tires and suspended by the air turbulence created by moving vehicles.

In developing the Eagle Mountain facility for the long term handling of solid waste, a new container handling yard, rail spur, and access road will be constructed. All three facilities will require the placement of significant quantities of structural base aggregate due to the low carrying capacity of desert soils at the site. The transfer and placement of native and imported aggregate will generate fugitive dust and vehicle exhaust emissions for a limited period of time.

Solid waste will be transported from the container handling yard to the active face of the landfill over a packed gravel road surrounding the landfill pit. Initial construction of this road, and spurs accessing it, will generate fugitive dust and vehicle exhaust emissions for a limited period of time. During the life of the East Pit, the main and spur roads will be periodically reconstructed as the road surface rises up the pit walls with the landfill surface and eventually lies on the landfill flanks. Although emissions from initial construction were not quantified, the emissions from road reconstruction will contribute to total on-site impacts during peak operation and are quantified below.

To periodically check the quality of groundwater under the landfill, monitoring wells will be drilled at the commencement of project operations. Prior to drilling, fugitive dust and exhaust emissions will be generated as a crawler tractor levels pads and the drills are moved into place. During initial drilling of each hole, some dust will be generated as the drill cuts into soil within the first three to five feet below the surface.

During the period of waste disposal and afterward, leachate from deposited waste will be collected and treated. Pipelines will carry leachate collected by the landfill liner to a wastewater pretreatment plant. The pretreatment plant will consist of a facility for the removal of floating oil and grease and grit. Effluent from the pretreatment plant will be directed to the existing plant which served the community of Eagle Mountain during Kaiser Steel's operation of the mine. Prior to project startup, the connecting pipeline will be constructed. This work will involve excavation for project components and disturbance of soil areas from the passage of construction equipment. These activities will generate fugitive dust and exhaust emissions.

To minimize the quantity of leachate collected and treated, a network of ditches and pipelines will capture and divert storm water falling in and around the landfill. Construction of this system will generate fugitive dust and exhaust emissions for a limited period of time. During the life of the project, surface ditches will require periodic maintenance to remove sloughed material. Although emissions from initial construction were not quantified, the emissions from maintenance will contribute to total on-site impacts during peak operation and are quantified below.

Prior to project startup, on-site facilities for the inspection of solid waste and storage of recycled components will be constructed. Construction of these facilities will generate fugitive dust and exhaust emissions for a limited period of time.

To comply with South Coast Air Quality Management District Rule 403, standard dust control measures such as prewatering will be used in the mitigation of fugitive dust from each of the activities listed above. Water will be obtained from existing wells located at the project site. Control effectiveness will be monitored visually by District inspectors and project supervisors. The application of water to travelled surfaces and exposed soil will be adjusted to maintain very low levels of visible emissions without creating mud. Mud carried offsite and deposited on paved roads will produce fugitive dust when dry.

Transfer Stations

During project operation, urban transfer stations will be used to segregate recyclables and hazardous materials, and to compact waste components. Streams destined for recycling may be temporarily stored on-site and periodically shipped to processors. When market demand is low for such materials, recyclables may be shipped to Eagle Mountain for storage pending sale. Nonrecyclable waste will be shipped from the transfer stations by rail for ultimate disposal at Eagle Mountain. Each transfer station will be served directly by a rail spur or be located near one. Containerized waste will be transferred by truck to railheads from those stations not directly served by rail.

Emissions are generated at the transfer stations by the operation of on-site vehicles. Diesel-powered construction equipment will be used to load segregated waste into compactors, load filled containers onto trucks or rail cars, and spot rail cars for loading. Where rail sidings are separated from transfer stations, truck and trailer combinations will be used to move containers offsite to railcars. A summary of equipment activity rates, emission factors, and daily emissions from a typical transfer site appears in Table 19. Corresponding data for all seven of the anticipated transfer stations appears in Table 20.

Solid Waste Transport

Solid waste will be transported to Eagle Mountain by two modes: trains and trucks. Approximately 80% of the waste will be transported by train, primarily from the Los Angeles basin, while the remainder will be hauled from central or eastern Riverside County by truck. Waste will arrive at Eagle Mountain in 25 ton containers compacted at urban transfer sites. Both transportation modes will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines.

Table 19

Eagle Mountain Project
Transfer Station Emissions (Single Station)
Proposed Project Without Mitigation

Vehicle Type	Number	Hr/Day	Fuel Gal/Hr	Location
Rubber-tired Loader	3	20	6	All stations
Container Handler	2	20	6	Truck-access stations
Train Car Spotter	1	5	7	Rail-access stations

Vehicle Type	Emission Factors (lb/1000 gal)*				
	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	325.18	81.00	31.70	23.48	33.54
Container Handler	325.18	81.00	31.70	23.48	33.54
Train Car Spotter	466.05	287.22	49.70	68.87	33.30

Vehicle Type	Emissions (lb/day)				
	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	117.07	29.16	11.41	8.45	12.07
Container Handler	78.04	19.44	7.61	5.63	8.05
Train Car Spotter	16.31	10.05	1.74	2.41	1.17
Total	211.42	58.65	20.76	16.50	21.29

Reference:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

Table 20

Eagle Mountain Project
Transfer Station Emissions (Total)
Proposed Project Without Mitigation

Vehicle Type	Number	Hr/Day	Fuel Gal/Hr
Rubber-tired Loader	21	20	7
Container Handler	12	20	6
Train Car Spotter	2	5	7

	Emission Factors (lb/1000 gal)*				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	325.18	81.00	31.70	23.48	33.54
Container Handler	325.18	81.00	31.70	23.48	33.54
Train Car Spotter	466.05	287.22	49.70	68.87	33.30

Vehicle Type	Number	Mileage Per Day
Transfer Truck/Trailer	24	450

	Emission Factors (gm/VMT)**				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Transfer Truck/Trailer	15.65	7.40	2.28	2.44	3.21

	Emissions (lb/day)				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	906.28	225.75	88.34	65.44	93.46
Transfer Truck/Trailer	372.72	176.11	54.20	58.17	76.45
Container Handler	468.26	116.64	45.64	33.81	48.29
Train Car Spotter	32.62	20.11	3.48	4.82	2.33
Total	1779.88	538.61	191.66	162.24	220.54

References:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

**California Air Resources Board's EMFAC7D/BURDEN7B models for 1995 calendar year, Southeast Desert Air Basin

Waste processed at urban transfer stations will be transported in unit trains over Southern Pacific and Eagle Mountain track. The trains will consist of 14 articulated cars, each capable of carrying 10 containers. Southern Pacific will pick up the loaded cars at urban transfer sites and ferry them to a siding near Ferrum Junction, where the Eagle Mountain spur line intersects. Eagle Mountain engines will hook up to the unit trains at Ferrum Junction and transport them to the container handling yard at the landfill facility.

Diesel locomotive emissions vary proportionately with fuel consumption. Fuel consumption is dependent upon the weight of the train being pulled and the vertical grade of the track. Because the transfer station to landfill route carries trains over two passes, fuel consumption and emissions are not constant over each section of the route. Therefore, separate fuel consumption estimates were generated for flat and inclined portions of the route. Also, as locomotives having different emission factors will be used on the Southern Pacific and Eagle Mountain portions of the route, care was taken to apply the appropriate factors to each portion. A summary of fuel use and emissions for portions of the route operated by the two carriers is shown in Table 21. This operation represents an average day with 4.7 trains making the round trip.

An estimated 20% (4000 tons per day) of waste will be transported to the project site by on-highway trucks. It is anticipated that within 75 miles driving distance from the project, the cost of transporting solid waste in containers from transfer stations using tractor-trailers will be less expensive than shipping it by rail. As a result, up to 100 trucks will make two trips per day to the project site with 20-25 ton loads. An analysis of the emissions from this activity, calculated at a maximum daily trip distance of 300 miles per truck, appears in Table 22.

On-Site Material Handling (except Fugitive Dust)

As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment consumes nearly 8,000 gallons of diesel fuel per day. Nearly 30% of this fuel is consumed by the fleet of trucks which will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations. The emission rates of equipment grouped within these categories are listed in Table 23.

At the peak of landfill activity, container haul trucks will be in almost constant motion. The disposal of 20,000 tons of solid waste in 20-25 ton containers will require 800-840 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 32 trucks will each complete a circuit of loading and dumping every 23-24 minutes.

Table 21

Eagle Mountain Project
Train Emissions - Average Operating Day
Proposed Project Without Mitigation

System	Fuel Use (gal/locomotive)		Number of Locomotives	Fuel Use (gal/trip)
Southern Pacific				
Basin to Ferrum	489		4	1956
Ferrum to Basin	570		2	1140
		Total		3096
Eagle Mountain				
Ferrum to Landfill	403		3	1209
Landfill to Ferrum	83		3	249
		Total		1458

	Pollutant				
	NOX	CO	PM10	VOC	SO2
Southern Pacific					
Emission Factor (lb/1000 gal)*	558	226	13	38.4	71
Emissions (lb/train)	1728	700	40	119	220
Emissions (lb/day)	8120	3289	189	559	1033
Emissions (tons/yr)	1482	600	35	102	189
Eagle Mountain					
Emission Factor (lb/1000 gal)^	403	162	17	63	71
Emissions (lb/train)	588	236	25	92	104
Emissions (lb/day)	2762	1110	116	432	487
Emissions (tons/yr)	504	203	21	79	89
Total System					
Emissions (lb/train)	2315	936	65	211	323
Emissions (lb/day)	10881	4399	306	990	1520
Emissions (tons/yr)	1986	803	56	181	277

References:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), factors for mixed GE and EMD locomotives.

^"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), factors for GE locomotives.

Table 22

Eagle Mountain Project
Delivery Truck Emissions
Proposed Project Without Mitigation

Truck Delivery Rate =	4000 tons/day
Truck Capacity =	20 tons/trip
Trip Length (round trip) =	150 miles
Total Haul Miles =	30000 miles/day

On-Highway Trucks	NOX	CO	PM10	VOC	SO2
Emission Factors, gm/VMT*	15.65	7.40	2.28	2.44	3.21
Total Emissions, lb/day	1035.32	489.18	150.55	161.59	212.36
Total Emissions, ton/yr	188.95	89.28	27.48	29.49	38.76

Reference:

*California Air Resources Board's EMFAC7D/BURDEN7B models for 1995 calendar year, Southeast Desert Air Basin

TABLE 23

Eagle Mountain Project
Onsite Mobile Equipment Exhaust Emissions
Proposed Project Without Mitigation

			Fuel	Emission Factors (lb/1000 gal)*					Emissions (lb/day)				
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
CONTAINER HANDLING YARD													
Overhead Crane	4	11	7	487.19	195.27	35.22	23.09	36.47	150.05	60.14	10.85	7.11	11.23
Container Handler	2	10	6	325.18	81.00	31.70	23.48	33.54	39.02	9.72	3.80	2.82	4.02
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
WASTE HAULING													
Container Hauler	32	10	7	318.92	89.22	19.57	14.48	34.83	714.38	199.85	43.83	32.43	78.01
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
LANDFILL FACE													
Crawler Tractor	10	10	14	258.27	64.57	27.00	14.48	33.30	361.57	90.39	37.80	20.27	46.62
Refuse Compactor	12	10	16	463.32	208.57	30.52	34.44	39.13	889.57	400.46	58.60	66.12	75.13
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
COVER EXCAVATION													
Rubber-Tired Loader	2	10	11	325.18	81.00	31.70	23.48	33.54	71.54	17.82	6.97	5.17	7.38
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
COVER HAULING													
Off-Highway Truck	5	10	7	318.92	89.22	19.57	14.48	34.83	111.62	31.23	6.85	5.07	12.19
APPLICATION OF DAILY COVER	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Crawler Tractor	3	10	14	258.27	64.57	27.00	14.48	33.30	108.47	27.12	11.34	6.08	13.99

TABLE 23 (Continued)

Eagle Mountain Project
Onsite Mobile Equipment Exhaust Emissions
Proposed Project Without Mitigation

	Number	Hr/Day	Fuel Gal/Hr	Emission Factors (lb/1000 gal)* NOx	CO	PM10	VOC	SO2	Emissions (lb/day) NOx	CO	PM10	VOC	SO2
DUST CONTROL AND ROAD MAINTENANCE													
12,000-Gal Tanker	2	11	20	318.92	89.22	19.57	14.48	34.83	140.33	39.26	8.61	6.37	15.32
Motor Grader	2	10	7	279.40	60.26	24.65	14.09	34.20	39.12	8.44	3.45	1.97	4.79
LINER CONSTRUCTION													
Frontend Loader	1	8	5	325.18	81.00	31.70	23.48	33.54	13.01	3.24	1.27	0.94	1.34
Pugmill	1	8	10.5	392.10	178.83	35.22	43.04	36.47	32.94	15.02	2.96	3.62	3.06
Dump Truck	1	8	6	318.92	89.22	19.57	14.48	34.83	15.31	4.28	0.94	0.69	1.67
Crawler Tractor	1	8	6	258.27	64.57	27.00	14.48	33.30	12.40	3.10	1.30	0.69	1.60
Compactor	1	8	6	463.32	208.57	30.52	34.44	39.13	22.24	10.01	1.47	1.65	1.88
BENCH CLEARING													
Crawler Tractor	1	8	6	258.27	64.57	27.00	14.48	33.30	90.39	22.60	9.45	5.07	11.66
MISCELLANEOUS													
Backhoe	1	2	3	466.05	287.22	49.70	68.87	33.30	2.80	1.72	0.30	0.41	0.20
Utility Truck	1	2	5	318.92	89.22	19.57	14.48	34.83	3.19	0.89	0.20	0.14	0.35
Grader	1	2	5	279.40	60.26	24.65	14.09	34.20	2.79	0.60	0.25	0.14	0.34
GRAND TOTAL, lb/day									2820.7	945.9	210.2	166.8	290.8
tons/yr									514.8	172.6	38.4	30.4	53.1

Reference:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

In the container handling yard, overhead cranes and container handlers will also operate continuously during peak periods. Cranes will transfer loaded waste containers from rail cars and tractor-trailers to container haul trucks and empty containers from returning haul trucks back to rail cars and tractor-trailers. All of this transfer equipment will be powered by diesel engines and generate exhaust emissions during operation.

Another area of concentrated mobile source activity will be the landfill face itself. In the area where final waste deposition occurs, twenty-five units of construction equipment will operate simultaneously. Crawler tractors will distribute dumped waste to shape the fill, while compactors will roll over the graded surface to develop the desired volume reduction of deposited material. After final compaction of waste, crawler tractors will spread and compact a layer of cover material.

Prior to the placement of waste in the mine pit, a mineral liner will be installed as a part of the leachate collection system. The bulk of liner material will derive from reclaimed fine tailing created during operation of the former iron mine. This material will be excavated by frontend loader from former settling ponds and fed to a wet mixer for blending with bentonite or other clay binder. Exhaust emissions will be produced by the frontend loader in excavating the tailing, by the pugmill mixer in preparing the liner mixture, by a dump truck in transporting the slurry to the pit, by a crawler tractor in shaping the material into a constant-thickness blanket, and by a compactor in rolling over the blanket to compress it.

The project will also reclaim coarse tailing on site to produce cover material for the waste. In this operation, a frontend loader will excavate material from storage piles and feed it to a stationary crushing plant. The crushed product will be transported by dump truck to the landfill face, where it will be spread and compacted. Exhaust emissions will be produced by each piece of equipment in the process, with the exception of the crushing plant, which will be electrically powered.

A separate fleet of vehicles will be used onsite to maintain the roadways used to transport liner, waste, and cover material. Two water trucks will wet roadway surfaces continuously during landfill operations to mitigate fugitive dust emissions and enhance compaction of surface material. As the main roads providing access to the working face of the landfill will be constructed in part on the landfill surface itself, frequent reconstruction will occur as the surface of the fill rises from the bottom of the pit. Graders will be used to apply new courses to road surfaces. All of these vehicles will generate exhaust emissions in the pit area during the life of the project.

In the excavation of ore by the former mining operation, benches were cut into the pit walls to catch falling rocks and to provide temporary roads for mine vehicles. These benches now harbor significant accumulations of loose rock which limit their ability to provide protection from falling rock to work forces in the lower portions of the pit. To regain a measure of safety, a crawler tractor will be used to push accumulated debris off of each bench prior to commencing waste disposal in that portion of pit below. Exhaust emissions from this vehicle will be generated during operation.

A network of perforated pipes will be installed throughout the deposited waste to collect and dispose of landfill gas generated by waste decomposition. Trenches will be excavated weekly in fresh waste deposits for the installation of horizontal pipe runs. Exhaust emissions will be generated by a backhoe and a grader used in the installation effort.

Landfill Gas Generation and Combustion

Landfill gas will be formed over time as waste decomposes. In the absence of oxygen, hydrocarbon wastes will break down to form predominantly carbon dioxide and methane. Trace quantities of toxic gases will also be formed by these processes. As discussed in the Section on Public Safety, the landfill gas collection system is assumed to capture approximately 80% of the gas generated. Captured gas will be piped to a combustion system for incineration. The remainder of the gas will escape the landfill through cracks in the cover layers.

The gas combustion system will initially use flares to burn the methane and toxic gases. The flares will be designed to mix the landfill gas with air and burn it in an open-topped chamber. Auxiliary fuel will be added when the energy content of the landfill gas is too low to maintain combustion. As the generation rate of landfill gases increases with the increasing age of deposited waste, the economics of recovering energy from the combustion of the gas will become more attractive. At some point during the life of the project, an energy recovery system will be substituted for the flares. The earliest date forecast for conversion is 1999, but this data is uncertain, due to uncertainties in estimating gas generation rates in an arid climate. Consequently, the project will be applying for permits to use only flares for landfill gas disposal. If a conversion to energy recovery equipment is proposed in the future, the impacts of that system will be the subject of a supplemental environmental review.

Most of the data existing on the generation rates of landfill gas come from studies conducted in the South Coast Air Basin. On the basis of this information, it is estimated that the project will generate between 18,000 and 46,000 cubic feet of gas per minute of landfill gas after 35 years of operation. While the factors which influence landfill gas production are not well understood, research data suggests that production rates increase with increased precipitation. Thus, because precipitation rates are lower at the project than in the coastal areas where landfill test data were collected, the gas generation rate for the project is expected to be at the lower end of the range of historical data. In order not to underestimate project impacts, however, the gas flow rate used in this analysis was that at the upper end of this range.

Limited data collected from landfill gas flares in the South Coast Air Basin show criteria pollutant emissions to vary significantly from flare to flare. These variations are most likely due to differences in construction and operation of the flares and to variations in the mixture of gases generated by each landfill. Standards for flare construction adopted by the South Coast Air Quality Management District in recent years and improvements in combustion technology will reduce some of the emission variability in new flares. In selecting emission factors representative of the flares proposed, data from source tests, South Coast Air Quality Management District regulations, and an equipment manufacturer's guarantee were reviewed. These data are summarized in Table 24, with a best estimate of flare emission factors based upon project design. Criteria emission rates from the flares, based upon maximum gas production rates and estimated emission factors, are shown in Table 25.

Trace quantities of toxic gases are contained in landfill gas and will be emitted from both cracks in the landfill surface and from the gas flares. The data collected by South Coast Air Quality Management District at a number of landfills shows concentrations of toxic gases in raw landfill gas to vary widely from site to site (see Table X-3, Public Safety). As all of these gases are organic, a sizable fraction of each of them will be incinerated as landfill gas is burned in the flare system. Data from South Coast Air Quality Management District testing indicates that destruction efficiencies in flares for these gases range from 70% to 99%+ with a majority of tests showing efficiencies above 99.0%. Emission rates of toxic gases from the landfill and from the flares at maximum landfill gas production rates are shown in Table 26. In this table, the maximum concentration of each toxic gas listed in Table X-3 and the average of 99.0% destruction efficiency were assumed for a worse case analysis.

Table 24

Eagle Mountain Mine Project
Gas Flare Emission Factors
(lb/MMBTU)

Units	NOx	CO	ROG	SO2	PM10
SCAQMD BACT (1)	0.060	NA	NA	NA	NA
Vendor Data (2)	0.060	0.290	NA	NA	0.024
Puente Hills (3)	0.083	0.068	0.080	0.011	NA
BKK (4)	0.013	0.482	0.022	0.005	0.073
Milliken (5)	0.141	0.132	0.136	NA	NA
Best Estimate	0.060	0.290	0.060	0.011	0.024

Notes:
(1) South Coast Air Quality Management District Best Available Control Technology Guidelines, January 1990
(2) Manufacturer's Guarantee
(3) California Air Resources Board Source Test, July 1986
(4) California Air Resources Board Source Test, July 1986
(5) South Coast Air Quality Management District Source Test, July 1988
(6) Best estimate factors reflect BACT levels for NOx, data for CO and PM10, average of CARB tests for ROG, and highest SO2 levels.

Table 25

Eagle Mountain Project
Landfill Gas Flare Emissions
Worst Case/Maximum Gas Generation Rate

Landfill Gas Production Rate = 46000 scfm
= 66.24 MMscf/day
Heat Content = 425 BTU/scf
Heat Input = 1173 MMBTU/hr

	NOx	CO	PM10	VOC	SO2
Emission Factors (lb/MMBTU)	0.060	0.290	0.024	0.060	0.011
Mitigation Efficiency:*	30%	90%		50%	
Emissions					
(lb/hr)	49.3	34.0	28.2	35.2	12.9
(lb/day)	1182.4	816.4	675.6	844.6	309.7
(tons/yr)	215.8	149.0	123.3	154.1	56.5

*Reflects urea injection for NOx control, oxidation catalyst for CO control at maximum gas generation rate.

Table 26

Eagle Mountain Project
Toxic Gas Emissions
Proposed Project Without Mitigation

Landfill Gas Production Rate =	46000 scfm
=	66.24 MMscf/day
Gas Collection Efficiency =	80%
Flare Gas Feed Rate =	36800 scfm
Fugitive Gas Release =	9200 scfm
Flare Efficiency =	99.0%
Catalyst Efficiency =	0.0% (worst case assumption)

Toxic Gas	Mole. Weight	Max. Conc. (ppb)	Flare Feed (lb/hr)	Flare Emission (lb/hr)	Fugitive Landfill Emission (lb/hr)	Total Emission (lb/hr)
Vinyl Chloride	62.50	12900	4.69	0.047	1.17	1.22
Benzene	78.11	11000	5.00	0.050	1.25	1.30
Dibromoethane	173.86	6	0.01	0.000	0.00	0.00
Dichloroethane	98.96	552	0.32	0.003	0.08	0.08
Dichloromethane	84.94	43000	21.24	0.212	5.31	5.52
Tetrachloroethene	165.83	53100	51.21	0.512	12.80	13.31
Tetrachloromethane	153.84	16	0.01	0.000	0.00	0.00
Tricloroethane	133.42	580	0.45	0.005	0.11	0.12
Trichloroethylene	131.40	15500	11.84	0.118	2.96	3.08
Tricloromethane	119.39	18	0.01	0.000	0.00	0.00

Fugitive Dust

Almost all project activities which involve the use of mobile equipment will generate fugitive dust. Although the solid waste will not be dry enough or have a sufficient fraction of fine material to contribute measurably to particulate emissions, the movement of vehicles over any surface within the project's boundaries will cause air pollution. Material spilled onto paved roads will be ground and suspended by traffic. The surface of unpaved roadways will abrade and become airborne with the passage of vehicles. Fine particles in the fine and coarse tailing will become airborne with the handling of these materials. The overhead cranes in the container handling yard, moving on suspended guideways, are possibly the only items of mobile equipment which will not produce fugitive dust while operating. Although mitigation techniques can significantly reduce particulate emissions from all sources, such emissions cannot be eliminated fully. A summary of computed fugitive dust emissions from the project appears in Table 27.

The emission rate of fugitive dust from roadway surfaces will be dependent upon a number of roadway and vehicle characteristics. Research indicates that the mass of fine particles within the loose material on a road surface will be the most significant parameter in the emission equation. This mass tends to be small on paved roads as the asphalt or concrete do not significantly abrade with traffic flow. Instead, the major sources of loose material on paved project road will be material dropped from vehicles previously travelling over bare earth areas, spillage of cover or liner material from haul trucks, tire wear, and dust fallout from nearby sources. In the case of unpaved roads, loose surface material will be generated primarily by the tire friction of passing vehicles on easily eroded soil particles. Additionally, the grinding action of tire friction will reduce the particle size of loose surface material, whether on paved or unpaved roads, until a point is reached where particles will be readily entrained in the turbulent wakes of passing vehicles.

The characteristics of the passing vehicles will also dictate the amount of PM10 generated with traffic flow. As the entraining forces on surface particles are dependent upon wind velocities generated by passing vehicles, vehicle speed will have a large influence on emission rates. Some surface particles in a vehicle's track will be thrown into the air by the passage of tires over that portion of the roadway. As a result, the number and size of tires on each vehicle will influence emission rates. The volume of traffic on a road surface will have a direct impact on emission rates over time. Finally, as the grinding action of tires is influenced by the pressure of the tires against a road's surface, the weight of each vehicle will have an influence on its fugitive dust emission rate.

TABLE 27

Eagle Mountain Project
Fugitive Dust Emissions
Proposed Project Without Mitigation

Activity	Annual Process Rate	Process Rate Units	Emission Factor* (lb/unit)	Control Factor* (%)	TSP Emission Rate (lb/hr)	PM10 Factor* (%)	PM10 Emission Rate (lb/hr)	PM10 Emission Rate (lb/day)	PM10 Emission Rate (ton/yr)
Waste Hauling	1433379	VMT	9.50	95%	186.45	0.22	41.02	410.20	74.86
Cover Excavation	3650	hr	5.70	90%	0.57	0.13	0.08	0.75	0.14
Cover Processing	2190000	ton	0.27	89%	18.16	0.52	9.52	95.18	17.37
Truck Loading	2190000	ton	0.01	0%	6.36	0.50	3.18	31.80	5.80
Cover Hauling	215780	VMT	16.80	95%	49.65	0.22	10.92	109.24	19.94
Cover Dumping	2190000	ton	0.01	0%	6.36	0.50	3.18	31.80	5.80
Cover Spreading	3650	hr	5.70	0%	5.70	0.13	0.75	7.50	1.37
Road Watering	56210	mi	9.38	90%	13.13	0.22	2.89	31.78	5.80
Road Grading	14600	mi	0.23	50%	0.45	0.54	0.24	2.44	0.45
Liner Excavation	2920	hr	34.23	90%	3.42	0.28	0.96	7.70	1.41
Liner Hauling	43800	VMT	9.38	90%	14.07	0.22	3.10	24.76	4.52
Bench Clearing	2920	hr	13.10	30%	9.17	0.16	1.48	11.87	2.17
Backhoe	730	hr	0.04	30%	0.03	0.76	0.02	0.04	0.01
Utility Truck	730	mi	3.79	90%	0.38	0.22	0.08	0.17	0.03
Grader	730	hr	0.23	50%	0.11	0.54	0.06	0.12	0.02
Windblown Fugitive Dust								0.18	0.03
			TOTALS		314.0		77.5	765.5	139.7

*See following Footnotes.

Table 27 (continued)

Footnotes

1. Waste Hauling, Cover Hauling, Road Watering, Liner Hauling, and Utility Truck Use: The emission factors are computed from AP-42 "Compilation of Air Pollutant Emission Factors", 11.2.6-1 (Industrial Paved Roads), using unpaved entry areas (multiplier = 7), 4 traffic lanes, 6% silt fraction, 5900 lb/mile surface dirt loading, and vehicle weights of 43 (waste hauling, road watering, and liner hauling), 94 (cover hauling), and 8 (utility truck use) gross tons loaded (for 50% of travel) and 18 (waste hauling, road watering, and liner hauling), 44 (cover hauling), and 8 (utility truck use) gross tons empty (for 50% of travel). The control efficiency is computed from EPA-450/3-88-008 "Control of Open Fugitive Dust Sources" with 0.80 mm/hr evaporation rate, 80 vehicle/hr traffic flow, 60 minute application interval, 3.00 gal/yd2 application rate for road watering, or sufficient watering to raise surface moisture content from 1% to 5%, or (from EPA-600/2-87-102 "Evaluation of the Effectiveness of Chemical Dust Suppressants on Unpaved Roads) monthly application of 0.30 gallons/yd2 of a 5:1 solution of water and Soil Cement. The PM10 conversion factor is from AP-42, 11.2.6-3 (Industrial Paved Roads).

2. Cover Excavation, Cover Spreading, Liner Excavation, and Bench Clearing: The emission factors are computed from AP-42, 8.24-5 (Western Surface Coal Mines, bulldozing overburden) with 1.0% (cover excavation and cover spreading), 20% (liner excavation), and 2% (bench clearing) silt contents (estimated from discussions with facility personnel) and 1% (cover excavation, cover spreading, and bench clearing) and 4% (liner excavation) moisture contents (estimated). The control factors are estimated from field data collected during the excavation of tailings at a former asbestos mine near Copperopolis, California. The PM10 conversion factor is computed from AP-42, 8.24-5 (Western Surface Coal Mines, bulldozing overburden).

3. Cover Processing: The emission factor is computed as the sum of emission factors for the stationary equipment included in the cover processing operation: 0.12 pounds/ton - dump hopper (from AP-42, 8.24-3, Metallic Minerals, dry transfer), 0.01 pounds/ton - belt transfer at base of dump hopper (from AP-42, 11.2.3-3, Aggregate Handling and Storage Piles, with 7.5 mph average wind and 1% moisture content), 0.02 pounds/ton - cone crusher (from AP-42, 8.19.2-4, Crushed Stone primary crushing at 1.5% moisture content), and 0.12 pounds/ton - pile stacker (from AP-42, 8.24-3, Metallic Minerals dry transfer). The average wind speed is taken from ARB's "California Surface Wind Climatology" for Desert Center and the moisture contents are estimated. The control efficiency is computed as a composite weighted by emissions from each of the stationary sources: 80% - dump hopper (estimated from vendor literature and inspection of hoppers equipped with hollow cone spray nozzles), 99% - belt transfer and cone crusher (estimated from vendor literature and MD-20 "Control of Particulate Emissions" for pulse-jet baghouses), 95% - pile stacker (estimated from vendor literature and inspection of stackers with drop height controllers,

Table 27 (continued)
Footnotes

midbelt deluge sprays, and head pulley solid cone nozzles). The PM10 conversion factor is an emission-weighted average covering each item of stationary equipment: 50% - dump hopper (from ARB "Information for Applying the State Ambient Air Quality Standards for PM10 to the Permitting of New and Modified Stationary Sources"), 100% - belt transfer and cone crusher (all emissions from baghouse assumed to be PM10), 60% - pile stacker (from AP-42, 8.23-4, Metallic Minerals, transfer of material with 4.0% moisture content).

4. Truck Loading, Cover Dumping: The emission factors are computed from AP-42, 11.2.3-3 (Aggregate Handling and Storage Piles), with 7.5 mph average wind speed (ARB, Desert Center) and 1% moisture content (estimated). The PM10 conversion factor is from the ARB PM10 permitting manual.

5. Road Grading, Backhoe Use, and Miscellaneous Grading: The emission factors are computed from AP-42, 8.24-5 (Western Surface Coal Mines, grading) with vehicle speeds of 2 mph (estimated for road and miscellaneous grading) and 1 mph (estimated for backhoe use). The control factors are estimated from EPA-450/3-88-008 with 0.80 water evaporation rate, 4 vehicle passes per hour, 8 hour water application interval, and 0.15 gallon/yd2 water application rate for road and miscellaneous grading, and are estimated from inspection of pipeline construction projects for backhoe use. The PM10 conversion factor is from AP-42, 8.24-5 (Western Surface Coal Mines, grading).

In producing suitable material for pit lining and waste covering operations, fine and coarse tailing will be processed on-site. In the production of pit liner, material will be excavated from former settling ponds by frontend loader and charged to a wet pugmill. As 90% of the fine tailing are silt-sized particles, this activity will generate significant emissions if performed unabated. To comply with South Coast Air Quality Management District Rule 403 (Fugitive Dust), this material will be prewatered with a sprinkler system prior to disturbance. Once charged to the pugmill, the fine tailing are maintained at a moisture content that will eliminate the emission of fugitive dust during the remainder of handling.

Coarse tailing will similarly constitute most, if not all, of the material needed for waste covering operations. A frontend loader will excavate the tailing from a large storage pile. The material will be dropped into a dump hopper which will feed one or more standard cone crushers. Output from the crushers will be belt conveyed to a temporary storage pile. Material from temporary storage will be loaded into haul trucks by a frontend loader and transported to the working face of the landfill. Dumped cover material will be spread and compacted by crawler tractors.

Although excavated coarse tailing may contain some indigenous moisture, water sprays and other controls will be needed to comply with emission limitations. Dust will be generated at each step of processing. Because of the very low fraction of this material which is smaller than 1/8 inch, and because of its low abrasion tendencies, the overall dusting potential of this material is comparatively low. The federal New Source Performance Standard for nonmetallic mineral processing plants requires low opacity emission levels or wet scrubbers. The South Coast Air Quality Management District Best Available Control Technology guidelines recommends baghouses or wet scrubbers for the control of dust from rock crushing facilities. In complying with these standards, emissions from the cone crushers will be maintained at low levels. Some dust will be emitted in transferring crusher product to the temporary stockpile, to haul trucks, and to a dumping area at the landfill face.

Low levels of dust will be emitted through road maintenance activities. As water trucks travel slowly in a continuous pattern of road sprinkling, fugitive dust emissions from this operation will be much lower than those generated by waste or cover material hauling. Also, as road fill will be watered to enhance compaction as it is applied, and as the process of road buildup will be performed by slow moving equipment, emissions from this activity will remain low in comparison to other project activities.

One project activity producing uncertain fugitive dust emission levels will be the clearing of natural debris from the pit benches. A crawler tractor will push this material off of benches as the landfill face moves along the pit walls. As material free falls off of each bench, fine particles in that material will become suspended in the air and contribute to pit emissions. As the content of fine particles

53

in the bench debris is not known, it is difficult to forecast the average level of emissions. In this analysis, the bench clearing emission factor was derived from factors reported for crawler tractors operating in surface coal mines although material at coal mines is known to be softer than at the Eagle Mountain site. This results in an overestimate of expected emissions from this activity. Bench debris could be prewatered to reduce dust emissions, and this analysis assumed a control efficiency of 30%. Because a sizable fraction of dust generated by the falling debris will fall out within the pit, the emission factor chosen has a built-in margin of safety.

Another source of dust at the working face of the landfill will be the installation of the landfill gas collection system. A backhoe will dig trenches in freshly compacted waste, into which gas collection pipe will be installed. A grader will be used to cover the ditches and recontour the cover material. Dust will be produced during both of these operations, but as equipment movements will be relatively slow, the fugitive dust emission rates will be low. Also, as this equipment will operate only two hours per day, its contribution to particulate emissions from the pit will be small.

Finally, there will be particulate emissions due to windblown fugitive dust from disturbed areas at times when there is no vehicle activity generating fugitive dust. However, these emissions are expected to be negligble, since most disturbed areas will be in regular use (with fugitive dust emissions accounted for elsewhere), or will be regularly treated, or both.

Overall Project Impacts - Emissions

Total project emissions from all sources at maximum projected operating levels are shown in Table 28. These emission levels include controls that the project must incorporate in order to comply with South Coast Air Quality Management District and U.S. Environmental Protection Agency emission standards. The emissions are reported in terms of pounds per day and tons per year.

Table 28

Eagle Mountain Project
Total Project Emissions*
Proposed Project Without Mitigation

Activity	(lb/day)					(ton/yr)				
	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Offsite Sources:										
Transfer Stations	1780	539	192	162	221	325	98	35	30	40
Trains	10881	4399	306	990	1520	1986	803	56	181	277
On-Highway Trucks	1035	489	151	162	212	189	89	27	29	39
Subtotal, Offsite	13696	5427	649	1314	1953	2500	990	118	240	356
Onsite Sources:										
Onsite Vehicle Exhaust	2821	946	210	167	291	515	173	38	30	53
Onsite Fugitive Dust			766					140		
Landfill Gas Flares	1182	816	676	845	310	216	149	123	154	57
Subtotal, Onsite	4003	1762	1652	1012	601	731	322	301	184	110
PROJECT GRAND TOTAL	17699	7189	2301	2326	2554	3231	1312	419	424	466

* Reflects measures required to comply with current regulations.

2) Project Impacts - Ambient Concentrations

Project Impacts Near the Landfill Site

Using the methodology described previously in Sections II.1 and II.2, an analysis was performed of the impacts of the project on ambient concentrations of pollutants. This analyis was performed for the area surrounding the landfill site; for the boundary of the nearest Class I area, the Joshua Tree National Monument; and for a typical rail crossing in the South Coast Air Basin.

All of the analyses described below were performed with a high degree of conservatism, with the result that the concentrations shown are much higher than the levels which would likely be experienced. This conservatism results from the following assumptions:

1. Landfill gas generation rates are the maximum forecast, 66.25 million cubic feet per day. This forecast was based on gas generation rates in the South Coast Air Basin. As discussed elsewhere in this report, gas generation rates at the Eagle Mountain site are expected to be much lower. Furthermore, the maximum landfill gas generation rates are not expected to be reached for at least 30 years after the project begins operation, if they are reached at all.

2. The analyses were performed based on the assumption that the landfill face was at an elevation which is not expected to be reached for at least 30 years.

3. Only currently available emission control technologies have been assumed, although recent history has shown that dramatic improvements will likely be made between the start of the project and the date worst case impacts could occur.

4. All of the air quality models were run in a screening mode. This means that the impacts were analyzed for a standard combination of wind speeds, wind directions, and mixing heights which do not necessarily reflect site conditions, and which were selected to maximize the modeled concentrations. Upon the collection of at least one year of actual weather data at the project site, the modeling analyses should be performed again. The use of the screening mode results in overestimates of concentrations, particularly for longer averaging periods (e.g., 24 hours, annual average).

Table 29 presents the results of the air quality modeling analysis. As discussed above, the analysis was performed in a screening mode, with a high degree of conservatism. Consequently, actual project impacts would be expected to be significantly lower than those shown.

Table 29

Maximum Impact of Proposed Eagle Mountain Project
on Ambient Air Quality
(without mitigation)
(all concentrations in micrograms per cubic meter)

Pollutant/ Averaging Time	California Standards	National Standards	Maximum Offsite Concen- tration	Maximum Background (1986-88)	Maximum Cumulative Impact	Maximum Impact at Class I Area	Allowable Class I Area Increment
CO							
1-hour	23,000	40,000	188.3	14,950	15,138	----	----
*8-hour	10,000	10,000	131.8	6,344	6,476	----	----
NO2							
1-hour	470	---	332.0	207	539	----	----
*Annual	---	100	27.3	32	59	8.1	2.5
SO2							
1-hour	655	---	71.3	210	281	----	----
*3-hour	---	1300	64.1	---	---	18.9	25
*24-hour	131	365	26.4	58	84	8.0	5
*Annual	---	80	6.6	5	12	2.0	2
PM10							
*24-hour	50	150	76.5	368	445	17.9	10.0
*Annual	30	50	19.1	65	84	4.5	5.0

*For project impacts:
3-hour = 0.9 x 1 hour
8-hour = 0.7 x 1 hour
24-hour = 0.4 x 1 hour
annual = 0.1 x 1 hour

The data indicate that the project's unmitigated impacts would represent the following fractions of the most stringent ambient air quality standards for each pollutant:

Carbon Monoxide	1%
Nitrogen Dioxide	71%
Sulfur Dioxide	20%
Fine Particulates (PM10)	153%

These levels are predictions of the worst case project impacts at any location outside of the project boundary. These concentrations are projected, in the absence of mitigation measures, at a location towards the northwest corner of the community of Eagle Mountain. The analysis is based on the extreme worst case assumption that the elevation of the landfill has risen to near the rim of the present mine site, while the size of the tailing pile has been substantially reduced. Thus, these conditions would reflect worst case operations after at least 30 years of project operations.

The relative contribution of sources to these levels are as follows:

	Landfill Equipment*	Flares
Carbon Monoxide	47%	53%
Nitrogen Dioxide		
1-hr average	75%	25%
Annual average	36%	69%
Sulfur Dioxide		
1,3 hr average	19%	81%
Annual average	8%	92%
Fine Particulates	100%	0%

*Includes fugitive dust.

Consequently, mitigation measures which reduce emissions from landfill equipment and flares would be effective, to varying degrees, in reducing project impacts.

Impact on Class I Areas

The Federal Prevention of Significant Deterioration program requires an extra level of protection for air quality in the vicinity of national parks and other special protected areas. The closest such area to the Eagle Mountain project is the Joshua Tree National Monument, which has its southern boundary just over two miles north of the project site.

Table 29 also presents the results of the modeling analysis at the Joshua Tree boundary, and compares these values with the allowable Class I area "increments". (It is expected that the Eagle Mountain project would not be subject to a formal PSD review, since project emissions would be below the regulatory thresholds for review. However, these increments of allowable growth can be used as one basis to evaluate the significance of the project's impacts.)

The analysis indicates that, in the absence of mitigation, the project impacts will exceed allowable increments at the Joshua Tree boundary for all three pollutants for which increments have been established: nitrogen dioxide, sulfur dioxide, and fine particulates (PM10). As noted previously, this conclusion will probably change upon a re-analysis using actual weather data from the project site.

Cumulative Impacts at the Project Site

The data indicate that, in the absence of mitigation measures, the project could result in exceedances of the state air quality standards for nitrogen dioxide and fine particulate matter. Emissions of carbon monoxide and sulfur dioxide are not expected to results in violations of air quality standards for those pollutants, even in combination with emissions from other sources.

Impacts at Typical Rail Crossings

During the scoping process, several commenters suggested that there may be adverse air quality impacts at locations in Southern California where rail crossings are at grade and periodically result in traffic backups waiting for a passing train. Using the same data presented elsewhere in the report regarding traffic impacts, a modeling analysis was performed to evaluate the potential air quality impacts during these events. The results are presented in Table 30.

The results of this analysis are presented for one-hour averaging periods only, since these impacts would occur for only short periods of time during the day. The data indicate that there would be only a minor impact for carbon monoxide during train crossings. The nitrogen dioxide impact reflects the short term concentration which could be reached near the intersection, assuming worst case weather conditions. As with previous analyses, these levels are likely to overestimate actual concentrations.

Screening Level Health Risk Assessment

As discussed in Section II.4.A.1), landfill gases can contain trace quantities of materials which are considered to be toxic air contaminants. For this analysis, an estimated 20% of these gases are assumed to escape from the landfill directly into the air, while the remaining 80% are expected to be captured by the landfill gas collection system and burned in the flares. A screening level health

56

Table 30

Eagle Mountain Project
Air Quality Impacts at Rail Crossings

Pollutant	California Standards ($\mu g/m^3$)	National Standards ($\mu g/m^3$)	Maximum Concentration ($\mu g/m^3$)	% of Strictest Standard
CO 1-hour	23,000	40,000	332	1.4%
NO2 1-hour	470	---	143	30.4%

risk assessment was performed on the flare and fugitive gas emissions using techniques recommended by the California Air Pollution Control Officer's Association. The results are presented in Tables 31 and 32.

The screening analysis indicates that the increased cancer risk from the proposed facility would be 19 in a million, based on the maximum gas production rate and the highest concentrations of trace toxic air contaminants. Based on the maximum gas production rate and average concentrations of trace toxic air contaminants, the increased cancer risk from the landfill operation would be approximately 6 in a million.

This risk would occur in the community of Eagle Mountain. As discussed above, these results are likely overestimates of the actual risk, and a re-analysis should be performed with actual weather data from the project site.

A more detailed analysis of the source of this risk indicates that 98% of the risk is associated with fugitive landfill gas emissions, and not the flares. Consequently, the fact that the project site is located in a dry climate where gas generation rates are expected to be lower is beneficial. In addition, the risks are associated with gas generation rates which would not be reached for 30 years, if ever.

Nonetheless, this is an area which should be addressed in a more refined modeling analysis, and additional mitigation measures may be required.

3) Consistency with Regulatory Programs

Consistency with Federal Requirements

Comparison with Prevention of Significant Deterioration Significance Levels - The determination as to whether the proposed project will be subject to Prevention of Significant Deterioration review is based on its emissions. For the proposed project, the "source" which could be subject to review includes the landfill gas flares and the mineral processing equipment. Table 33 displays the emissions for that equipment and the corresponding PSD emission trigger levels. (Fugitive emissions are not included in the assessment of applicability under federal prevention of significant deterioration regulations.)

The use of flares to incinerate landfill gas, in compliance with all other regulations, could cause the project to exceed prevention of significant deterioration trigger levels at the maximum expected flow rate, in the absence of any mitigation. In order to reduce project emissions, however, mitigation has been proposed for flare emissions. Such mitigation will be provided through the installation and operation of a selective non-catalytic reduction system and an

Table 31

Eagle Mountain Project
Landfill Gas Risk
Maximum Trace Concentrations

Landfill Gas Production Rate	46000 scfm	Maximum Groundlevel Impact	
=	66.24 MMscf/day	from Unit Emission Rate =	15.27 ug/m3
Gas Collection Efficiency =	80%	Unit Emission Rate =	1.00 gm/sec
Flare Gas Feed Rate =	36800 scfm	Ratio of Annual to	
Fugitive Gas Release =	9200 scfm	1-Hour Concentrations =	0.1

Toxic Gas	Mole. Weight	Max. Conc. (ppb)	Fugitive Landfill Emission Rate (lb/hr)	Fugitive Landfill Emission Rate (gm/sec)	Maximum Groundlevel Concentration (ug/m3) (1-Hour)	Maximum Groundlevel Concentration (ug/m3) (Annual)	Unit Risk Value 1/(ug/m3)	70-Year Risk
Vinyl Chloride	62.50	12900	1.17	0.15	2.26	0.23	7.0E-06	1.58E-06
Benzene	78.11	11000	1.25	0.16	2.40	0.24	5.3E-05	1.27E-05
Dibromoethane	173.86	6	0.00	0.00	0.00	0.00	7.2E-05	2.10E-08
Dichloroethane	98.96	552	0.08	0.01	0.15	0.02	2.2E-05	3.36E-07
Dichloromethane	84.94	43000	5.31	0.67	10.22	1.02	1.0E-06	1.02E-06
Tetrachloroethene	165.83	53100	12.80	1.61	24.63	2.46	5.8E-07	1.43E-06
Tetrachloromethane	153.84	16	0.00	0.00	0.01	0.00	4.2E-05	2.89E-08
Tricloroethane	133.42	580	0.11	0.01	0.22	0.02	1.6E-05	3.46E-07
Trichloroethylene	131.40	15500	2.96	0.37	5.70	0.57	1.3E-06	7.41E-07
Tricloromethane	119.39	18	0.00	0.00	0.01	0.00	2.3E-05	1.38E-08

TOTAL RISK = 1.83E-05

Table 32

Eagle Mountain Project
Landfill Gas Risk
Average Trace Concentrations

Landfill Gas Production Rate	46000 scfm	Maximum Groundlevel Impact	
=	66.24 MMscf/day	from Unit Emission Rate =	15.27 ug/m3
Gas Collection Efficiency =	80%	Unit Emission Rate =	1.00 gm/sec
Flare Gas Feed Rate =	36800 scfm	Ratio of Annual to	
Fugitive Gas Release =	9200 scfm	1-Hour Concentrations =	0.1

Toxic Gas	Mole. Weight	Max. Conc. (ppb)	Fugitive Landfill Emission Rate (lb/hr)	Fugitive Landfill Emission Rate (gm/sec)	Maximum Groundlevel Concentration (ug/m3) (1-Hour)	Maximum Groundlevel Concentration (ug/m3) (Annual)	Unit Risk Value 1/(ug/m3)	70-Year Risk
Vinyl Chloride	62.50	6735	0.61	0.08	1.18	0.12	7.0E-06	8.24E-07
Benzene	78.11	3160	0.36	0.05	0.69	0.07	5.3E-05	3.66E-06
Dibromoethane	173.86	4	0.00	0.00	0.00	0.00	7.2E-05	1.28E-08
Dichloroethane	98.96	242	0.03	0.00	0.07	0.01	2.2E-05	1.47E-07
Dichloromethane	84.94	7880	0.97	0.12	1.87	0.19	1.0E-06	1.87E-07
Tetrachloroethene	165.83	11434	2.76	0.35	5.30	0.53	5.8E-07	3.08E-07
Tetrachloromethane	153.84	16	0.00	0.00	0.01	0.00	4.2E-05	2.89E-08
Tricloroethane	133.42	368	0.07	0.01	0.14	0.01	1.6E-05	2.20E-07
Trichloroethylene	131.40	4078	0.78	0.10	1.50	0.15	1.3E-06	1.95E-07
Tricloromethane	119.39	11	0.00	0.00	0.00	0.00	2.3E-05	8.60E-09
							TOTAL RISK =	5.59E-06

Table 33

Eagle Mountain Mine Project
Emissions Subject to PSD Review
(ton/yr)

	NOx	CO	PM10	VOC	SO2
Without Mitigation					
Gas Flares	308	1490	123	308	57
Mineral Processing			18		
Total	308	1490	141	308	57
With Mitigation*					
Gas Flares	216	149	123	154	57
Mineral Processing			18		
Total	216	149	141	154	57
PSD Trigger Level (ton/yr)	250	250	250	250	250

Notes: Annual Emissions assumes 66 $MMft^3$ cubic feet of landfill gas at 425 BTU/SCF produced per day, 365 days per year

* Mitigation for flares at maximum gas generation rates is urea injection for NOx control and oxidation catalysts for VOC and CO control.

oxidation catalyst in the event that gas flow rates approach the maximum predicted levels.

The oxidation catalyst, in a temperature regime up to 1400°F, can achieve better than 90% control efficiency for carbon monoxide in normal operation. The same catalyst bed will produce reductions in reactive organic gas emissions exceeding 50%. The selective non-catalytic reduction catalyst would use ammonia or urea to reduce NOx emissions by 30%. The oxidation catalyst system would be installed on the flares if gas generation exceeds approximately 10 million cubic feet per day. The selective catalytic reduction system would be installed if gas generation exceeds approximately 50 million cubic feet per day. A summary of stationary source emissions, as defined in federal regulations, with mitigation is also presented in Table 28.

<u>New Source Performance Standards for Non-Metallic Mineral Processing Plants (40CFR60.670)</u> - Emissions generated by the dropping of material from the frontend loaders into the dump hopper will be controlled by water sprays producing a spray curtain across the open top of the hopper. Emissions generated by the freefall of crushed material from the conveyor belt to the surface of the storage pile will be controlled by deluge sprays and an elevator system for the conveyor belt. The deluge sprays will deliver a sufficient quantity of water to material travelling up the storage pile conveyor belt to result in an average moisture content exceeding 8% in particles smaller than 100 microns in diameter. This action will cause the smaller particles to agglomerate to larger particles.

Particulate emissions from the processing of fine tailing will be eliminated by the use of sufficient quantities of water in the mixing process. Fine tailing, damp from watering prior to excavation, will be fed to a pugmill for conversion to a paste-like consistency. At this stage, where water contents are increased beyond 12%, dusting will be eliminated. This elevated moisture content will be maintained throughout transport and application of the fine tailing.

Consistency with Local Requirements

Prohibitory Rules

The South Coast Air Quality Management District limits the emissions of various pollutants from many sources in the District, including landfill flares and other gas combustion devices. These rules will apply to the proposed project, and the project has been designed to comply with them. The applicable rules and a brief summary of each are discussed below:

<u>Rule 401 (Visible Emissions)</u> - This rule limits the opacity of visible emissions from any source. Under current District policy, this rule will apply to emissions from the landfill gas flares, the coarse tailing crushing circuit, and the fine tailing pugmill.

57

Rule 403 (Fugitive Dust) - This rule limits the visibility and particulate matter concentration of dust plumes at project boundaries. Fugitive dust emissions from haul roads, excavation areas, and waste disposal areas will be regulated by this rule.

Rule 404 (Particulate Matter - Concentration) - This rule limits the concentration of particulate matter emitted from source stacks. This rule will apply to landfill gas flares.

Rule 405 (Solid Particulate Matter - Weight) - This rule limits the mass emission rate of particulate matter from sources. This rule will apply to the landfill gas flares, the crushing equipment, and the fine tailing pugmill.

Rule 409 (Combustion Contaminants) - This rule limits the concentration of particulate matter from combustion sources. The landfill gas flares will be regulated by this rule.

Rule 431.1 (Sulfur Content of Gaseous Fuels) - This rule limits the sulfur content of landfill gas combusted on-site or offered for sale. This rule will apply to the landfill gas flares and the sale of any landfill gas.

Rule 53 (Specific Air Contaminants) - This rule limits the concentration of sulfur compounds in the exhaust of any source. The rule will apply to the landfill gas flares.

Rule 1150.1 (Control of Gaseous Emissions from Active Landfills) - This rule requires the collection and treatment of landfill gases. It will apply to the landfill gases generated by the project.

Rule 1401 will require that a health risk assessment be performed for the emissions from the facility.

New Source Review Rules

The South Coast Air Quality Management District New Source Review rules (contained in Regulation II and Regulation XIII of the SCAQMD Rules and Regulations) govern the preconstruction review of new and modified stationary sources that emit nonattainment pollutants. The project site is located in the Southeast Desert Air Basin, which is designated as unclassified for all pollutants with respect to the National Ambient Air Quality Standards. With respect to California Ambient Air Quality Standards, the desert portion of Riverside County (including the project site) is designated nonattainment for ozone and fine particulate matter (PM10), and attainment or unclassified for all other pollutants.

As a result of the state nonattainment status for ozone and PM10, the project must undergo new source review for these pollutants and their precursors. Therefore, direct and precursor emissions of PM10, as well as ozone precursors, are subject to new source review. South Coast Air Quality Management District Rule 1302 defines reactive organic gases and nitrogen oxides as precursors to ozone, and reactive organic gases, nitrogen oxides, and sulfur oxides as precursors to particulate matter. New source review would not apply to emissions of carbon monoxide, for which state and federal air quality standards are being met.

For the purpose of new source review, Rule 1302 defines a facility as:

> "Any permit unit or grouping of permit units or other air contaminant-emitting activities which are located on one or more contiguous properties within the District, in actual physical contact or separated solely by a public roadway or other public right-of-way, and are owned or operated by the same person (or by persons under common control)."

In the evaluation of projects by the South Coast Air Quality Management District, related fugitive emissions are often included in the calculation of accountable project emissions. With respect to the proposed project, the District will not be permitting the landfill itself. Only the landfill gas collection and disposal (flare) system and the mineral (cover) processing plant will be permitted. District policy has held that the fugitive emissions from the landfill operation per se will not be included in the new source review analysis.

Furthermore, District policy has been that only those mobile source emissions <u>directly associated with a permit unit</u> must be considered. Since the only permit units at the site will be the flares and the cover processing plant, the District staff has informally concluded that emissions from on-site vehicles, as well as exhaust emissions from project-related cargo carriers (on-highway trucks and locomotives), will not be included in the new source review analysis.

Rule 1303 requires that the applicant apply Best Available Control Technology (BACT) to any new or modified stationary source. In its <u>Best Available Control Technology Guideline</u>, the South Coast Air Quality Management District specifies the minimum control technology requirements for landfill gas flares. The Guideline specifies two general alternative levels of control that would apply to the project emissions: (1) the use of control methods that are technologically feasible, barring a demonstration that the methods are not cost-effective, or (2) the use of control methods that have been achieved in practice or are contained in an Environmental Protection Agency approved State Implementation Plan, regardless of cost.

For the gas flares, the BACT Guideline specifies the following control methods:

Technologically Feasible

Nitrogen oxides:	less than 0.06 pounds of NOx per million BTU
Sulfur oxides:	gas scrubbing and/or carbon adsorption for hydrogen sulfide removal
Particulates:	fuel gas filter

Achieved in Practice

Reactive organics:	Ground level, shrouded flare with ≥ 0.6 second retention time at ≥ 1400^{o}F, automatic combustion air control, automatic shutoff gas valve and automatic restart system
Nitrogen oxides:	0.06 pounds of NOx per million BTU
Carbon monoxide:	same as reactive organics
Particulates:	knockout vessel

The Guidelines require that technologically feasible control measures be imposed unless it can be demonstrated that the capital and operating costs per ton of pollutant removed or destroyed are greater than the District's cost-effectiveness exemption thresholds. Information gathered from one flare vendor indicates that an exemption on the basis of cost could not be demonstrated. Therefore, this analysis assumes that the technologically feasible control measures will be installed on the project's flares.

For the coarse tailing (cover) processing plant, the best available control technology guideline specifies the following control methods:

Technologically Feasible

Particulates:

1. Baghouse
2. Venturi Scrubber
3. Impingement Scrubber
4. Charged Fog Spray or Water Spray with Chemical Additives

Achieved in Practice

Particulates: Water Fog Spray

A screening cost/benefit analysis using a typical design for a baghouse control system indicated that such equipment did not exceed the District's cost exemption threshold. For the processing equipment configuration proposed in the project design, using the economic factors required in the guidelines, the cost effectiveness of a baghouse system is estimated at $208 per ton of particulate matter. As the District exemption threshold for particulate matter is $5,300 per ton, it was assumed that a baghouse would be required for control of emissions from the coarse tailing processing system.

Rule 1303 requires that the applicant offset all net emission increases from any new or modified facility. However, Rule 1309.1 provides that the offset requirement for emissions from landfill gas control equipment can be satisfied through withdrawals from a "Community Bank" of offsets. Since this rule was adopted in June 1990, it is not yet clear how this Bank will operate.

4) Mitigation

This discussion of mitigation measures includes regulatory actions by other agencies which are reasonably foreseeable, or which have future effective dates, as well as measures which can be implemented by the applicant. Regulatory measures which are already in effect are discussed in Section I.6, above. Estimates of project emissions reflect those measures required to comply with currently adopted regulations.

Truck Emissions

Diesel engine exhaust emissions from the truck transport of waste to the landfill will contribute to the cumulative environmental impact of the project. This transport will be carried out by waste disposal operations not under Mine Reclamation Corporation's control. Truck emissions from waste transport will be mitigated primarily by transporting most of the incoming waste by rail, thereby eliminating truck emissions except for the short haul from transfer station to railhead. This short haul is present to some degree in all project configurations and all alternatives to the project, including the no project alternative. Truck emissions will also be mitigated by a number of California Air Resources Board and local district regulations already in place, or which are expected to be adopted in the near future. These regulations include:

1. existing California Air Resources Board emissions standards for heavy-duty Diesel engines, and still more stringent standards to take effect in 1991 and 1994;

2. California Air Resources Board regulations limiting the sulfur and aromatic hydrocarbon content of motor vehicle Diesel fuel;

3. existing South Coast Air Quality Management District smoke enforcement program for excessive visible smoke from Diesel vehicles;

4. the new California Air Resources Board/California Highway Patrol smoke enforcement and anti-tampering program for heavy-duty trucks, to begin in 1990;

(a\

5. anticipated new "low emission vehicle" regulations for heavy-duty engines, due to be developed and adopted in 1991; and

6. anticipated South Coast Air Quality Management District Rule 1601, requiring phase-in of low emission vehicles in fleets.

California Air Resources Board 1991 and 1994 emissions standards - A new set of very stringent NOx and particulate emissions standards for new heavy-duty engines used in on-highway vehicles will take effect beginning in the 1991 model year. These standards will require NOx emissions less than 5.0 g/BHP-hr and particulate emissions less than 0.25 g/BHP-hr. These represent a 17% and a 58% reduction, respectively, from the present standards, which have been in effect since 1988. Compared to uncontrolled emission levels, the 1991 standards will require roughly a 50% reduction in NOx and a 75% reduction in particulates. A still more stringent particulate emissions standard of 0.10 g/BHP-hr (representing a 90% reduction from the uncontrolled level) will go into effect in 1994.

Although these standards will only apply to new engines, they will result in gradual reductions in emissions as new trucks replace older ones. On average, it may take ten years for the majority of the benefits of new vehicle standards to be achieved.

California Air Resources Board Diesel fuel regulations - California Air Resources Board regulations presently limit the sulfur content of motor vehicle Diesel fuel sold in the South Coast Air Quality Management District to 0.05% by weight. This is one tenth of the sulfur which would otherwise be permitted under the ASTM standards for number 1 and number 2 Diesel fuel. In 1993, this restriction will be extended statewide. A maximum aromatic hydrocarbon content of 10% by volume will also take effect at that time. The reduction in sulfur contributes directly to a 90% reduction in SO_2 emissions, and also helps to reduce PM10 emissions somewhat. The California Air Resources Board expects the reduction in aromatics (which are currently around 30%) to further reduce PM10 and NOx emissions. Diesel NOx emissions are projected to be reduced by about 4% by this measure, while particulate emissions would be reduced about 5-10%.

South Coast Air Quality Management District smoke enforcement program - Under an interagency agreement between the South Coast Air Quality Management District and the California Highway Patrol, a limited number of California Highway Patrol officers have been assigned full-time to smoke enforcement activities. These officers patrol freeways and other roads in the South Coast Air Quality Management District, observing and citing vehicles which emit excessive smoke. In addition, the District has a widely publicized program encouraging motorists to call a toll-free number to report smoking vehicles, including trucks.

Cited vehicles must be repaired to reduce their smoke emissions. Since cited vehicles are typically "gross emitters" of PM10 and VOC, their repair should greatly reduce PM10 and VOC emissions from cited vehicles. Furthermore, the possibility of a citation serves to encourage truck owners to improve their maintenance practices. Both effects contribute to lower VOC and PM10 emissions than would otherwise be experienced. These benefits are not presently quantifiable, however.

<u>California Air Resources Board/California Highway Patrol smoke enforcement and anti-tampering program</u> - This new program was mandated in SB 1123, and the details are not yet completely established. A pilot program was completed last year, but the program results are not yet available. A key element of the plan is that trucks pulling into California Highway Patrol weight and safety inspection stations will be visually checked for smoke emissions, and apparent high emitters will be flagged out of line for a confirmatory test, after which they may be cited. Anti-tampering inspections of engine emission controls may also be carried out. Anti-smoke inspections may also be carried out in other California Highway Patrol enforcement activities. Cited vehicles will be required to undergo repair to reduce their smoke emissions. Both the citations themselves and the desire to avoid them should help to improve the general maintenance and sensitivity to excess smoke emissions in the heavy-duty truck fleet. This program is expected to contribute to a significant reduction in average smoke and PM10 emissions from heavy-duty Diesel trucks. The specific extent of these benefits is not yet quantifiable, however.

<u>California Air Resources Board low emission vehicle regulations</u> - In a series of workshops recently, the California Air Resources Board staff have proposed to create several new categories of "low emission" vehicles. Manufacturers would be required to make these low emission vehicles a certain percentage of their California sales, with the required percentage beginning at less than 10%, and escalating to 100% by the year 2000. The intent is, first, to ensure that low-emission vehicles are available for fleet owners to purchase in order to comply with South Coast Air Quality Management District Rule 1601; and later, to phase in low-emission vehicles across the board. The present proposals cover only passenger cars and light-duty trucks, but a separate rulemaking addressing medium-duty and heavy-duty vehicles is also planned. The emissions standards proposed for light-duty vehicles are extremely stringent. Compared to California 1994 light-duty standards -- already the strictest in the world -- they would cut the permissible emission levels for NOx by 50%, and for non-methane HC by 70%.

California Air Resources Board staff have stated their intention to develop similarly technology-forcing emissions standards for medium-duty and heavy-duty vehicles, beginning in Fall, 1990. So far, there has been no public indication of what these standards might entail. However, based on California Air Resources Board's stated concerns about heavy duty vehicle emissions, a recent California Air Resources Board proposal concerning light-heavy duty Diesels (which would effectively ban them), and the technology-forcing approach California Air Resources Board is taking with light-duty vehicles, the

California Air Resources Board is expected to propose a significant reduction in the heavy-duty Diesel NOx standard, from the present 5.0 g/BHP-hr to around 2 or 3 g/BHP-hr. This standard will be very difficult, and may be impossible, to meet using even advanced-technology Diesel engines. It may thus force the use of alternative fuels in the affected vehicles.

If these technology-forcing emissions standards are actually proposed and adopted, engine manufacturers would be forced to commercialize and market engines using alternative fuels such as methanol and natural gas, or using reformulated gasoline with advanced electronic controls and catalyst systems. This would result in a further emissions reduction of the order of 50% in both PM10 and NOx emissions, compared to Diesel engines meeting California Air Resources Board's 1994 emissions standards. VOC and CO emissions may not be reduced, however, and could well be increased, since Diesel engines have inherently low emissions of these pollutants.

South Coast Air Quality Management District Rule 1601 - The South Coast Air Quality Management District has been developing this rule for some time. A draft of the rule was presented at a public workshop held October 21, 1988. No further revisions have been made public yet, but another public announcement and workshop are anticipated in the near future, with rule adoption sometime late in 1990.

As outlined in the October 21, 1988 proposal, Rule 1601 would apply to all vehicle fleets containing 15 or more vehicles registered in the South Coast Air Quality Management District. The owner or lessee of any such fleet would be prohibited from adding any new vehicle to it (including any newly-purchased used vehicle) unless the new vehicle were a "low emission" vehicle, or unless the fleet already contained the required percentage of LEVs.

The South Coast Air Quality Management District staff have indicated that, in its initial form, Rule 1601 will apply only to light-duty vehicles, but that it is planned to extend it to heavy-duty vehicles as soon as the California Air Resources Board adopts low emission vehicle emissions standards for them. Once this occurs, any heavy-duty vehicle fleet containing 15 or more vehicles would be required to begin phasing in low emission vehicles. Most garbage companies hauling waste to the Eagle Mountain landfill will probably operate more than 15 vehicles, and would thus be covered by these requirements. This would assure that low emission vehicles would be introduced into these fleets relatively early, thus helping to maximize the potential benefits.

As discussed above, however, it would still take about ten years before the majority of the benefits of this measure would be achieved.

Locomotive Emissions

Diesel engine exhaust emissions from railway locomotives will contribute to the cumulative environmental impact of the project.

These emissions will result from the operation of Southern Pacific Railroad locomotives hauling the waste from the Los Angeles/Orange County area to the Ferrum Junction siding and Eagle Mountain Railway locomotives hauling the waste trains from the Ferrum Junction siding to the landfill site, as well as from train switching and idling. Emissions from the Southern Pacific locomotives are not under Mine Reclamation Corporation's control. However, a study of locomotive emissions and regulatory strategies by the California Locomotive Emissions Advisory Committee is presently under way. Authority for the U.S. Environmental Protection Agency to regulate locomotive emissions is also included in several of the Clean Air Act amendment bills presently under consideration in Congress, raising the possibility of federal emissions regulation as well. Some potential control measures which might be required under these regulations include:

1. Reduction in idling emissions by shutting down locomotives whenever they will not be needed for at least one hour;

2. Use of low-sulfur, low aromatic fuel meeting California requirements for motor vehicle Diesel fuel;

3. Stringent emissions standards for Diesel engines used in new locomotives;

4. Retrofit of emissions controls such as retarded injection timing, low-temperature aftercooling, combustion modifications, and revised engine speed-load schedules to existing locomotives;

5. Use of catalytic trap-oxidizer systems on new or existing Diesel locomotives to reduce PM10 and VOC emissions;

6. Use of selective catalytic reduction on new or existing Diesel locomotives to reduce NOx emissions;

7. Use of alternative "clean" fuels such as methanol, LPG, or natural gas in locomotive engines; and/or

8. Electrification of railway operations.

Any of the foregoing measures could theoretically be applied to the Eagle Mountain railway locomotives as well. This could occur as a result of new regulatory mandates from the California Air Resources Board or the U.S. Environmental Protection Agency, or on a voluntary basis, as part of a mitigation strategy.

Operational measures to reduce emissions - Locomotive engines are traditionally left idling when they are not in use - which is typically more than 50% of the time. By issuing instructions to the engineers to shut down the engines whenever they will not be needed during the next hour, it will be possible to reduce this idling time by around 10 hours per locomotive per day, with a savings of approximately 60 gallons per locomotive per day in fuel. (The one hour period is based on the need to reduce engine wear which would be associated with excessive starts, and reducing emissions during extended idling.) If emissions were strictly proportional to fuel consumption, this would reduce emissions by about 24 lb of NOx, 4 lb of VOC, 14 lb of CO, and 1 lb of PM10 per locomotive per day. In fact, NOx emissions per unit of fuel tend to be somewhat lower at idle than under other conditions, while VOC, CO, and PM10 emissions are typically much higher. Thus, the reduction in NOx would be somewhat less than 24 lb/locomotive-day, while the reductions in VOC, CO, and PM10 would be higher than the values shown above.

Other operational measures to minimize locomotive fuel consumption would also have the effect of reducing emissions. These would include regular preventive maintenance of the engines, with special attention given to fuel injector performance. In the case of the Eagle Mountain Railway locomotives, engineers should be instructed to report any signs of excessive smoke (greater than 20% opacity) so that the engine could be scheduled for repairs. Smoke opacity measurements should be made using an end-of-stack opacity monitor after each engine is rebuilt, and at each scheduled service interval or unscheduled engine maintenance thereafter. (An opacity monitor is a device which shines a light across the exhaust stack to determine how much smoke is present.) A record of each machine's opacity measurements and related repairs should be kept as part of its maintenance record. This will allow maintenance personnel and supervisors to identify both short-term and long-term changes in smoke opacity which would signal the need for maintenance to reduce emissions.

Preventive maintenance and monitoring of smoke emissions will help to ensure that the engine is performing at peak efficiency, and that VOC and PM10 emissions are as low as possible. In addition to these direct benefits, an aggressive preventive maintenance program will help ensure locomotive reliability, reducing the need to assign extra locomotives against the possibility that one or more units is in substandard condition. This will further reduce fuel consumption and pollutant emissions.

<u>Low sulfur/low aromatic fuel</u> - California Air Resources Board regulations limiting the sulfur and aromatic content of Diesel fuel do not apply to fuel used in locomotives. Typical railroad Diesel fuel has a sulfur content as high as 0.5% by weight, and 30-40% aromatic hydrocarbons by volume. Use of Diesel fuel meeting California Air Resources Board sulfur standards would reduce SO_2 emissions by 90%. Particulate emissions would also be reduced by about 0.07 g/BHP-hr, or roughly 15-30%, due to the reduction in sulfate particles. This would add about $0.02 per gallon to the cost of the fuel, or about $3.50 per pound of SO_2 eliminated. Use of fuel containing no more than 10% aromatic hydrocarbons, as well as low sulfur, should further reduce PM10 and possibly NOx emissions. Estimates of the emissions benefit for on-highway truck engines are of the order of 4% reduction in NOx and 5-10% reduction in PM10. If a similar percentage reduction were

seen in locomotive engines, NOx emissions would be reduced by about 0.5 g/BHP-hr, and PM10 emissions by about .02-.04 g/BHP-hr. Low-aromatic fuel is anticipated to cost about $.10 extra per gallon.

<u>Locomotive emissions standards</u> - Studies presently under way in California, as well as current Clean Air Act proposals, make it appear very likely that locomotive engine emissions standards may be established by the U.S. Environmental Protection Agency, the California Air Resources Board, or both within the next decade. These regulations will probably require at least a 50% reduction in NOx emissions, and will likely mandate some reduction in PM10 as well. It is likely that these standards will be applied both to new locomotives and to existing locomotives at the time they undergo a major engine overhaul.

To comply with these regulations, locomotive engine manufacturers would be required to develop emissions-controlled versions of their engines. These emission-controlled engines will probably include at least the following: low-temperature charge-air cooling, retarded injection timing, electronic control of injection timing and fuel quantities, combustion chamber modifications, and changes to piston rings, valve seals, etc. to reduce oil consumption. Retrofit packages incorporating these modifications would then be installed during engine overhaul.

The availability of new locomotive engines meeting emissions standards and/or retrofit packages to bring existing locomotives up to those standards will depend on the whether and when such standards are established, as well as on the degree of stringency they exhibit. These are presently uncertain. Therefore, the timing and magnitude of any emissions reductions due to such standards cannot be quantified at this point. At the present time, there are no such kits available.

<u>Emission control retrofits</u> - Even in the absence of a specific low-emissions retrofit package, a number of modifications could be made to reduce locomotive emissions. These modifications will be discussed only with reference to the Eagle Mountain railway locomotives, as the project would have no control over Southern Pacific locomotives, and there are presently no regulatory proposals to this end. Potential modifications to the GE locomotives planned for use at Eagle mountain include the following (effects are given in parentheses).

1. Upgrade fuel injection systems to current technology (reduce fuel consumption 2-2.5%, reduce smoke, PM10 and VOC emissions).

2. Retard fuel injection timing by a fixed 4-6° increment (reduce NOx probably 35-40%, reduce power, increase fuel consumption, smoke, PM10)

3. Upgrade turbochargers to current technology (reduce fuel consumption, smoke, and PM10, increase power output).

64

4. Install separate-circuit aftercooling to reduce charge air temperature (reduce fuel consumption, NOx, smoke, and PM10, increase power output).

5. Modify engine and dynamic brake speed schedules, introduce multi-step dynamic brake speeds (reduce fuel consumption, smoke, and emissions).

6. Add eddy-current clutch for radiator fan (reduce parasitic loads and fuel consumption).

Except for items 2 and 4, these are all standard engineering changes, fully supported and documented by General Electric. The cumulative effect of these standard changes should be to reduce fuel consumption by about 10%. Smoke (and presumably PM10 and VOC emissions) should also be reduced substantially by these changes.

Retarding the injection timing 4° and lowering the intercooler temperature has been shown to give nearly a 50% reduction in NOx emissions from an EMD 645 locomotive engine without increasing smoke or VOC emissions to an unacceptable level. Similar measures would likely produce significant benefits in these General Electric engines. A demonstration program would be required in order to verify the extent of the NOx benefits, as well as any detrimental effects on other emissions.

Trap-oxidizer systems - Catalytic trap-oxidizers have been shown to be highly effective in reducing Diesel engine emissions of PM10, VOC, and toxic air contaminants. Reductions of 80-90% in particulate matter and 50-80% in VOC are typical. A trap-oxidizer system could thus be especially effective in counteracting the increase in PM10 and VOC emissions which is otherwise likely as a result of retarding injection timing for NOx control. Low-sulfur fuel is required to ensure that the platinum-group catalysts use do not create a problem with excessive sulfate emissions, and fuel consumption is typically increased by 2-5%.

The difficulty of ensuring reliable regeneration and adequate durability has prevented trap-oxidizer deployment in highway vehicles (except for a limited number of Mercedes passenger cars) up to the present time. With their high load factors and predictable duty cycles, locomotives could be good candidates for trap-oxidizer application, however. To date, however, trap-oxidizers have not been demonstrated on any engine approaching that of a locomotive in size. Trap-oxidizer size is limited by thermal stresses and manufacturing constraints. The large engine size and high exhaust flowrate of a locomotive would require that a large number (10-20) of trapping elements be arranged in parallel. While this poses no problem in principle, the resulting volume, heat radiation from the hot surfaces, etc. could create a difficult packaging problem within the confined space of a locomotive.

Questions about the efficacy, durability, and impacts on engine performance, reliability, and safety of trap-oxidizers in locomotive service would have to be answered before this measure could be considered feasible for the Eagle Mountain project.

Selective Catalytic Reduction - Selective catalytic reduction control technology can reduce NOx emissions up to 90%. The technology involves injecting ammonia in the post-combustion region upstream of a catalyst. The ammonia reacts with NOx in the combustion products and forms nitrogen and steam. The catalyst assists this process by causing the reaction to occur at lower temperatures.

SCR technology is currently being used to control NOx emissions from electric utility boilers, refinery heaters and boilers, gas-fired IC engines, and gas-fired gas turbines. In addition, SCR technology has been installed on a number of spark-ignited engine installations and a few pilot injection dual fuel engines. However, SCR technology has been applied to fuel oil-fired diesel engines as a control alternative for NOx emissions only on a very limited basis and not for continuous utility applications.

There are only a few commercial projects in which SCR has been applied to diesel engines. In the United States (Massachusetts), there is currently a 5 MW diesel engine project on which SCR is being used as a NOx control technology. This unit is equipped with a Steuler molecular sieve catalyst system. However, this unit is completely different from typical marine Diesel engines. The Massachusetts engine is basically a diesel-ignited, natural gas-fired engine and, therefore, does not run solely on low sulfur diesel fuel oil. The engine has been in operation for two years and to date has accumulated nearly 7000 hours of operation on diesel fuel. The operator indicates that the SCR unit is operating satisfactorily and is having no difficulty achieving the guaranteed 90% NOx reduction. However, severe system control problems were experienced at startup. Although ammonia slip is not measured, there is no detectable ammonia odor.

One engine manufacturer (SWDiesel) has indicated that there is a 6 MW dual fuel engine in West Germany which is equipped with the Steuler SCR system. Like the engine in Massachusetts, the 6 MW dual fuel engine operates chiefly on natural gas. SWD has also identified one small mine locomotive diesel engine, commissioned in March 1988, which has also been equipped with an SCR system. This engine operates intermittently and for a limited number of hours.

Nitrogen Nergas Corporation has demonstrated a base metal catalyst on several types of diesel-powered engines in Southern California. The Nitrogen Nergas SCR unit has been applied to diesel-powered dredge barges, standby engines and drilling rigs up to approximately 6000 hp in size. The applications include three Caterpillar diesel engines on an oil drilling rig in Ventura County; three 1200 hp to 400 hp diesel engines manifolded to a single SCR unit on a dredge barge; three large standby diesel engines at Xerox

Corporation; a 600 hp Caterpillar diesel water pump engine owned by Eastern Municipal Water District; and two rock crushers. The longest operating experience is on the dredge barge engine, which has accumulated approximately 8000 hours of operation in 18 months. These applications are more similar to marine diesel engines because they operate on 100% diesel fuel. However, they are not directly comparable because some marine diesels are nearly twice the size of the largest engine (or larger) on which the SCR system has been demonstrated and because the engines have not been in long term, continuous service.

In addition to the lack of demonstrated full-time, continuous diesel service, one of the most significant unknown operating factors associated with this technology is catalyst plugging that decreases the amount of catalyst surface area available for the reaction to proceed and eventually renders the catalyst inactive. SO_3, which is formed by the oxidation of SO_2, reacts with the ammonia to form ammonium bisulfate (a particulate emission) which could cause fouling of the SCR system. This problem is not as acute with a dual-fuel engine, because long periods of operation on diesel fuel do not occur. The Nitrogen Nergas catalyst system uses a guardbed configuration to remove some of the particulate sulfate from the exhaust stream before it comes in contact with the catalyst material. This seems to be effective in extending catalyst life by protecting it from substances that would cause plugging and poisoning. However, it adds additional complexity to the system as well as increasing required maintenance.

Haldor Topsoe of Denmark has developed a titanium oxide monolith catalyst that has been demonstrated in fuel oil service on two residual oil-fired ship engines. The Haldor Topsoe DENOX SCR system was installed on the main engine of two Korean vessels for testing under controlled conditions. The ships' engines are switched to low sulfur diesel fuel prior to startup of the SCR unit, and the SCR unit is completely bypassed during residual fuel oil firing. These engines are 10,680 hp slow-speed diesel engines. Typical operation of these SCR units will be approximately 12-14 hours each month. The operation of the SCR systems was tested during five journeys, with total testing period of approximately 40 hours. NOx removal efficiency has been measured at over 90%.

Other disadvantages to SCR systems include difficult ammonia control problems, increased maintenance costs to clean the catalyst, high capital and operating costs, and the necessary handling and storing of ammonia. Depending upon the formulation of the catalyst, the spent catalyst material may be considered hazardous waste and would contribute to the shortage of available landfill sites for this material. In addition, the presence of sulfur in the diesel fuel may result in the formation of ammonium bisulfate and contribute additional particulate emissions.

As discussed above, there is a great deal of uncertainty about the reliability of SCR systems in diesel engine applications. The ammonia handling requirements and the complexity of auxiliary equipment associated with SCR systems further enhance the concerns about the operation and maintenance of this control technology. Effective SCR operation requires close control of ammonia injection rates as engine operating conditions vary.

Several operators of diesel engines equipped with SCR have described serious ammonia control system problems experienced on startup that made it difficult to maintain stable and consistent NOx emission reductions. While these problems were eventually resolved, they, along with uncertainty regarding quantities of catalyst material required, ammonia injection rates, loss in catalyst efficiency and increases in backpressure, are some of the potential problems that add to the uncertainty regarding system performance and cost.

Based on the status of selective catalytic reduction technology as applied to Diesel engines, selective catalytic reduction for the Eagle Mountain Railway Diesel locomotives cannot be considered technically feasible at the present time.

<u>Alternative fuels</u> - Use of alternative fuels such as methanol, natural gas, or LPG could significantly reduce locomotive emissions. No locomotive engines using these fuels are presently available. However, a large number of high-powered, medium-speed, lean-burn engines are presently in use in stationary applications, burning natural gas and other gaseous fuels. These engines closely resemble locomotive engines in their technical characteristics, and in some cases are directly derived from Diesel engines which <u>are</u> used in locomotive service. There have also been some laboratory experiments using methanol in two-stroke locomotive engines. However, the economics of natural gas are more favorable, the technology is better developed, and the potential for reducing overall emissions is greater.

Diesel engines can be modified to use natural gas in either of two ways. The first is <u>dual fuel</u> operation, in which the natural gas charge is ignited by injecting a small amount of Diesel fuel. These engines exhibit good performance and low emissions at high loads, but HC and CO emissions tend to increase dramatically under low-load conditions. Dual-fuel engines normally idle on Diesel fuel alone. The alternative is <u>spark ignition</u> operation, in which the Diesel injector is replaced by a spark plug (or spark plug and prechamber, in larger engines), and the engine runs on 100% natural gas. Unlike dual-fuel engines, these engines require throttling to control power output, and tend to have relatively high light-load fuel consumption. Because the Diesel combustion is completely eliminated, however, emissions can be very low. NOx emissions less than 1.5 g/BHP-hr are routinely demonstrated using this technology in stationary source applications. This can be compared to 12-14 g/BHP-hr for present uncontrolled locomotive engines, and a probable minimum of 5-6 g/BHP-hr with the maximum feasible Diesel NOx control. Particulate emissions (which tend to go up dramatically with Diesel NOx control) are also reduced to very low levels using this technology.

Ⴑ60

Before spark-ignition natural gas engines could be used in locomotives, it would be necessary to develop and demonstrate the requisite technology. Two approaches to this are possible. In the first approach, an existing Diesel locomotive engine would be replaced by a commercially available natural gas engine. Two good candidate engines for this replacement are the Caterpillar 3600 series natural gas engines and the Waukesha AT series. Both of these engine series are derived from Diesel engines used in locomotives. The second approach would be modify the existing Diesel locomotive engine to use natural gas fuel.

Natural gas fuel storage for locomotive engines would require attention in either case. Natural gas can be stored on a vehicle either as a cryogenic liquid (LNG) or a highly compressed gas (CNG). CNG storage requires about 5 times the volume of Diesel fuel for equivalent energy, while LNG requires about twice the volume. For the Eagle Mountain Locomotives, sufficient CNG storage for one day's operation could probably be placed on board the locomotive, replacing the Diesel fuel tank. Longer hauls would require a CNG tender, or the use of LNG, either on-board the locomotive or in a cryogenic tender. Both compressed gases and liquified natural gas are routinely shipped in special railcars, so these tenders would involve little in the way of new technology. The only difference from a regular cargo shipment would be in the provision of a fuel connection between tender and locomotive.

The use of an alternative fuel in Diesel locomotive engines would have to be evaluated further before it could be considered feasible for the Eagle Mountain project.

<u>Electrification</u> - Technology for railway electrification is readily available -- both EMD and General Electric offer electric locomotives -- and has been widely adopted in other countries. Electrification also offers some significant advantages in the area of locomotive power and reliability, maintenance requirements, and operational characteristics. The major impediments to its use in the U.S. are the high costs of the catenary cable systems to supply the electricity, plus the associated costs of extensive modifications to railway signal systems to make them compatible with electric traction. The need to purchase substantial quantities of new electric locomotives is also a deterrent - electric locomotives are more than twice as expensive as current Diesel-electrics.

Electrification (at least of main lines) is one of the principal locomotive emissions control measures now under consideration by the Locomotive Emissions Advisory Committee and California Air Resources Board. If adopted, this requirement would presumably affect the Southern Pacific mainline used to transport waste from Los Angeles to Ferrum Junction. This possibility will not be considered further here, however. Instead, this evaluation examines the feasibility of electrifying the 52-mile Eagle Mountain Railway line between Ferrum Junction and the landfill site.

The characteristics of the Eagle Mountain-Ferrum Junction line are poorly suited to electric locomotive operation. Electric locomotives can generate up to twice the traction horsepower of a Diesel locomotive. However, the maximum tractive force they can generate is limited by the coefficient of friction of the wheels on the rail, and by the temperature limits of the traction motors. These are no greater than for a Diesel locomotive. Thus, to pull a heavy train up a steep grade requires the same number of locomotives, whether Diesel or electric. The only difference is that the electric locomotives will be able to pull it faster. Where sharp turns and the physical limitations of the track restrict maximum speed, however, this advantage cannot be put to full use. Thus, an electric locomotive provides relatively little advantage over a Diesel-electric unit costing only half the price when new, and available used at less than half that cost.

A more detailed analysis of the relative costs and benefits of electrification of the Eagle Mountain railway would have to be conducted before this could be considered a feasible measure.

Landfill Equipment Emissions

Exhaust pollutant emissions from the Diesel engines used in landfill and waste-handling equipment at the Eagle Mountain Mine site will contribute to the cumulative environmental impact of the project. Conceivable measures which could be taken to mitigate this impact include:

1. Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;

2. Regular preventive maintenance to prevent emissions increases due to engine problems;

3. Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle Diesel fuel;

4. Purchase and use of turbocharged and intercooled Diesel engines when available, with retarded injection timing;

5. Purchase and use of low-emitting Diesel engines meeting California emissions standards for highway trucks;

6. Purchase and use of landfill equipment meeting California emissions standards for construction equipment, when these take effect;

7. Use of catalytic trap-oxidizer systems on Diesel engines;

8. Use of alternative "clean" fuels such as methanol, LPG, or compressed natural gas in landfill equipment engines; and/or

9. Electrification of landfill equipment operations.

Operational measures to reduce emissions - Operational measures to conserve fuel and reduce emissions include minimizing engine idle time, using only the number of machines required for a given volume of waste handled, and minimizing queueing time for loading and unloading through efficient scheduling. Idle time will be minimized by instructing equipment operators to shut down their machines rather than letting them idle for more than five minutes. Operational managers will be instructed to schedule machines and operators to match the anticipated waste volume, and to match the numbers of container haulers to the container handling capacity at each end to avoid excessive queue formation. This will help to reduce operating costs and wear and tear on equipment as well as emissions.

Preventive maintenance - All landfill equipment should be subject to regular preventive maintenance in order to detect and prevent mechanical problems which can lead to increased emissions. These mechanical problems include clogged air filters, worn or damaged turbochargers, and problems with the fuel injection system. Equipment operators and supervisors should be instructed to report any evidence of excessive smoke or other symptoms so that the equipment can be scheduled for maintenance in a timely fashion. Smoke opacity measurements should be made using an end-of-stack opacimeter upon receipt of the equipment, and at each scheduled service interval or unscheduled engine maintenance thereafter. A record of each machine's opacity measurements should be kept as part of its maintenance record. This will allow maintenance personnel and supervisors to identify both short-term and long-term changes in smoke opacity which would signal the need for maintenance to reduce emissions.

Low sulfur/low aromatic fuel - California Air Resources Board regulations limiting the sulfur and aromatic content of motor vehicle Diesel fuel will take effect in 1993. According to California Air Resources Board staff, construction vehicles and other landfill machinery are included in the California Air Resources Board's expanded definition of a "motor vehicle". Thus, this regulation will require all landfill equipment to use low-sulfur/low aromatic fuel. Since landfill equipment engines are technically similar to those used in trucks, the reduction in emissions will probably be of the same order and that projected for truck engines by California Air Resources Board. The reduction in sulfur will reduce SO_2 emissions by 90%, and will reduce PM10 emissions by roughly 0.07 g/BHP-hr, which is roughly 10-20% of anticipated PM10 emissions. Based on California Air Resources Board's projections for truck engines, the reduction in aromatic content should reduce NOx emissions by about 4%, and lead to a further 10-20% reduction in PM10 emissions.

Turbocharging/intercooling/retarded injection timing - NOx and particulate emissions from Diesel engines can be reduced through a combination of turbocharging, intercooling (to the lowest temperature practical), and retarded injection timing, especially at high loads. Turbocharged and intercooled engines should be chosen for all major Diesel equipment purchased for use in the landfill, unless (a) there are no suitable equipment models available with turbocharging and intercooling, either as standard equipment or as an available option; or (b) the manufacturer demonstrates that the engine achieves similar emissions performance by some other means. This latter exception would include on-highway certified engines, or engines meeting California Air Resources Board emissions standards for construction equipment.

Except in the case of engines which are already emission-controlled (in which timing is normally retarded already), all Diesel engines in landfill equipment should have their fuel injection timing adjusted to a retarded setting. The degree of timing retardation used should be chosen to reduce NOx as much as possible, while minimizing the increase in smoke, PM10, and VOC emissions due to the retarded timing. The optimal degree of timing retardation will vary from one engine model to another, and should be selected in consultation with the engine manufacturer.

Use of on-highway engines - In addition to turbocharging, low-temperature intercooling, and retarded injection timing, Diesel engines certified to meet California's 1991 emission standards for on-highway vehicles will exhibit a number of other emissions-related modifications and control technologies. These will generally include electronic control of fuel injection timing and quantity, increased fuel injection pressure, and optimization of piston and combustion chamber design to reduce emissions. These engines will be required to emit no more than 5.0 g/BHP-hr NOx and 0.25 g/BHP-hr of particulate matter. Achieving these targets will require extensive engine optimization, so that these on-highway certified engines will generally exhibit lower emissions overall than off-highway engines retrofitted with specific emissions controls. Engines meeting 1994 on-highway standards will achieve even lower PM10 emissions, probably through the use of catalytic trap-oxidizers or catalytic converters in conjunction with still more advanced emission control technology.

Among the landfill equipment, the container carriers and liner-construction dump truck will closely resemble on-highway trucks, and should be equipped with on-highway certified engines. It may also be possible to use these engines (or very similar engines utilizing nearly the same technology) in other landfill equipment such as the dozers, compacters, loaders, scrapers, and off-highway trucks. This will not always be possible, however, due to the important differences in duty cycle, torque rise requirements, engine mounting, and cooling requirements between construction machinery and on-highway trucks. The feasibility of using an on-highway certified engine should be reviewed for each piece of landfill equipment, and such engines should be used unless (1) there is no suitable engine available or (2) the mounting and installation requirements, or duty cycle limitations, make it infeasible to use any available engines in the specific equipment under consideration.

California Air Resources Board construction equipment standards The California Air Resources Board is expected to issue a workshop notice containing proposed emissions standards for construction

68

equipment within the next two months. The California Air Resources Board's current plan is to have regulations comparable to the 1991 on-highway emissions standards in stringency. These regulations would go into effect in 1996. Landfill equipment meeting these regulations would presumably become available in late 1995. When this happens, any subsequent equipment purchases should be limited to equipment meeting these requirements. Exceptions will be the container haulers and water tankers, which should continue to be purchased with on-highway certified engines.

Catalytic trap-oxidizers - Catalytic trap-oxidizers have been shown to be highly effective in reducing Diesel engine emissions of PM10, VOC, and toxic air contaminants. Reductions of 80-90% in particulate matter and 50-80% in VOC are typical. These systems could thus be especially effective in counteracting the increase in PM10 and VOC emissions which is otherwise likely as a result of retarding injection timing for NOx control. Low-sulfur fuel is required to ensure that the platinum-group catalysts use do not create a problem with excessive sulfate emissions.

The difficulty of ensuring reliable regeneration and adequate durability has prevented trap-oxidizer deployment in highway vehicles (except for a limited number of Mercedes passenger cars) up to the present time. With their higher load factors and predictable duty cycles, construction and mining machines are excellent candidates for trap-oxidizer application, and they have been employed successfully in several mining operations. To date, trap-oxidizer usage has not been demonstrated in landfill operations, however, and there is presently no commercial trap system available for landfill equipment. In addition, trap-oxidizer use would raise a number of questions concerning effects on safety, performance, reliability, and durability of landfill equipment.

These questions would have to be answered before trap-oxidizer systems could be considered feasible for installation on Diesel fueled landfill equipment.

Alternative fuels - Replacement of Diesel engines with engines using alternative fuels such as methanol, LPG, or natural gas could conceivably reduce pollutant emissions. At present, no such engines are available in any of the equipment types planned to be used in landfill operations. A number of engines using methanol and compressed natural gas are under development for use in on-highway trucks, however, and the first such engines (the Detroit Diesel 6V-92 methanol engine and Cummins L10 natural gas engine)are expected to be commercially introduced in transit buses in 1991. These engines are expected to be rated at 240 to 270 HP. This is too low a power rating for most of the landfill equipment planned.

Additional engines are expected to be introduced in response to future California Air Resources Board low emission vehicle (LEV) regulations. These engines could be used directly in the container haulers, and could conceivably be adapted for use in dozers, compactors, and other items of landfill equipment. However, this is unlikely to occur significantly before 1996, the year in which California Air Resources Board's planned emissions standards for construction equipment would take effect. Thus, it would be necessary to compare the emissions benefits and costs of alternative fuel use with those for Diesel equipment meeting California Air Resources Board emission standards.

Electrification - Replacement of Diesel or alternative-fuel prime movers with electric motors would produce virtually a 100% reduction in exhaust emissions. Successful electrification of landfill operations requires that a reliable supply of electric power be provided to the equipment at all times. Battery systems capable of delivering the power and energy densities required for landfill equipment do not yet exist. This limits the range of equipment which could feasibly be electrified to those which do not move, or which have only a very limited range of motion. These would include the container unloading cranes in the container handling yard, the pug mill used for liner material preparation, and the belts which may be used for the transportation and loading of cover material. Electrifying the overhead crane is estimated to reduce Diesel consumption by 308 gallons per day, while electrifying the pug mill would save 84 gallons per day, for a total of 392 gallons, or 5% of the total fuel consumed in the landfill operation. The reduction in emissions would also be roughly 5%.

In addition to the foregoing, it is also conceivable that waste could be transported from the container handling area to the landfill face using an electric conveyor, rather than container handling vehicles shuttling between the two. This would not be practical, however. For efficient and sanitary landfill operation, waste must be deposited near the working face so that bags, etc. are not broken open and scattered during transportation. The working face will advance as much as 250 feet per day, however. As a result, it would be necessary to continually reposition the electric conveyors. The resulting downtime (as well as reliability problems) would have a severely deleterious effect on the efficiency of operation.

The same concept could be applied to the cover material, however. A conveyor could transport cover material roughly 75% of the distance to a staging area, where a truck would haul it the remaining distance.

Mitigation for On-Site Material Handling Impacts

Particulate emissions from material handling operations will contribute to the cumulative environmenal impact of the project. These emissions will be regulated by U.S. Environmental Protection Agency new source performance standards and several South Coast Air Quality Management District regulations. Affected sources will include the processing of coarse and fine tailing. As the solid waste is comparatively damp and large in particle size, no particulate emissions have been observed from the handling or processing of this

C1

material at operating landfills, and none are expected with the proposed project. Regulations which will establish control technology requirements for these operations were discussed in Section I.6. above.

No mitigation measures, beyond compliance with applicable regulations, have been identified for on-site material handling operations.

Mitigation for Landfill Gas Generation and Combustion Impacts

Fugitive landfill gas emissions from the landfill surface and combustion emissions from the flaring of landfill gas will contribute to the cumulative environmental impact of the project. These emissions will be regulated by South Coast Air Quality Management District Rules 1150.1 and 1401. The first directly regulates emissions from landfills while the latter two, if adopted, will require the analysis and limit the emissions of toxic compounds from any new or modified facility.

Techniques for compliance with these rules are described in Section I.6.E above.

In addition, to compliance with these rules, Mine Reclamation Corp. has committed to two additional mitigation measures to reduce landfill gas generation and combustion impacts.

First, if the landfill gas generation rate exceeds 10 million cubic feet per day, either an energy recovery system will be installed to replace the flares, or the flares will be equipped with oxidation catalysts. As final decisions on energy recovery options have not been made, this analysis will focus only on control of emissions from the flares. A proposal to substitute energy recovery equipment for the flares will be subject to future environmental review.

Oxidation catalysts can oxidize concentrations of carbon monoxide and hydrocarbons in the flare exhaust to form carbon dioxide and water. In order to avoid catalyst damage, it will be necessary to modify the flares to recover energy from the exhaust and reduce stack exit temperatures to 850° or less. The catalysts will consist of blocks of platinum-coated ceramic honeycomb. A number of these blocks will be mounted in a stainless steel frame to produce a porous wall through which all of the exhaust gas will pass. Each catalyst will be located a sufficient distance downstream of the flare burner so as to receive cooled exhaust gas at the temperature which is optimum for catalyst efficiency. The design control efficiency of the catalyst for carbon monoxide will be 90%, and for non-methane hydrocarbons will be 50%. Catalyst life is expected to be guaranteed by the vendor to be a minimum of two years of continuous operation.

Second, if the landfill gas generation rate exceeds 50 million cubic feet per day, the flares will be additionally equipped with urea injection systems. These systems will inject aqueous solutions of urea into areas of 1400°-1750° F temperature regime upstream of the oxidizing catalysts. The urea solution will reaction with oxides of nitrogen in the flare exhaust to produce molecular nitrogen, carbon dioxide, and water. The control effectiveness of urea injection for oxides of nitrogen from a flare is estimated at 30% or higher. For this analysis, the lower end of this range is used to conservatively overestimate emissions.

Mitigation for Fugitive Dust Impacts

Fugitive dust emissions due to the handling or passage of vehicles over native material and tailing will contribute to the cumulative environmental impact of the project. Primary sources will include the movement of vehicles over project roads, the excavation of tailing, the spreading and compaction of cover material, and the construction of landfill systems. Landfill systems include access roads and landfill gas pipelines.

Road Surfaces - Fugitive dust emissions from road surfaces should be mitigated by either water application, aggregate and dust palliative application, or paving. For roads which are under construction or are very temporary, such as the landings from which container haul trucks will dump, frequent watering should be used to maintain surface moisture contents above 4%. At maximum onsite traffic levels and peak evaporation rates, the water application rate may reach 3 gallons per square yard per hour in order to maintain the 95% control efficiency.

Chemical dust suppressants applied to the surface of compacted coarse tailing should be used to control fugitive dust emissions on transitional roads. Transitional roads are those which will be periodically reconstructed, such as the landfill circumference road. Upon completion of periodic reconstruction, the road will be surfaced with a course of tailing. This material should be compacted and sprayed with a solution of water and chemical additive. The solution application rate will depend on the type of additive used (ie., asphalt emulsion, petroleum resin, acrylic cement, etc.) and concentration of the solution. Research data should be used to select two to four commercial products for onsite testing during project startup. Demonstration sections of treated roadway should be visually inspected on a daily basis to determine the duration of dustless operation. The additive which is most cost-effective in maintaining negligible visible emissions should be chosen for ongoing project use. The results of the field study should also be used to determine the necessary chemical reapplication interval.

For onsite roads which will be permanent in location, such as those providing access to and movement within the container transfer yard, paving should be used to control fugitive dust. In the construction of these roads, coarse tailing or other suitable aggregate should be used to provide an acceptable structural base to support project vehicles. Two to three inches of asphalt concrete should be applied as an overlay. As necessary, paved roads should be cleaned with mechanical sweepers to maintain levels of loose surface material below those which would produce visible emissions.

Tailing Excavation - Fugitive dust emissions from the excavation of coarse and fine tailing should be mitigated by prewatering. The moisture content which achieves nearly dustless conditions upon excavation and loadout of the tailing should be used as a standard measure for tailing acceptability. The roadbed used by loaders to deliver the tailing to each mixing circuit should also be watered to maintain the same minimum moisture content.

If it is found effective in reducing fugitive dust emissions, material in the processed coarse tailing storage pile should be watered prior to loadout into haul trucks. Because this pile is expected to contain only a small fraction of fine material, and because surface application may not allow penetration of water to the interior of the pile, it is not obvious that watering at this juncture will have an impact on emissions generated by the subsequent handling of this material. During initial application of cover material, tests should be conducted to determine the effectiveness of this practice. If visible emission reductions are achieved during testing, this practice should become a standard operating procedure for the project.

Miscellaneous Sources - Fugitive dust from other excavation activities should be mitigated by surface prewatering. These activities include the clearing of sloughed material on pit benches, the excavation of landfill gas pipeline ditches, and the maintenance of unpaved road surfaces. A high pressure pump mounted on one of the water trucks should be used to spray the surface of bench material prior to removal. This same vehicle should be used to spray the surface of cover material during spreading if such a practice is found effective during initial testing. Areas to be excavated for landfill gas pipeline installation should be prewatered with a portable sprinkler system. Rear spray water trucks should be used to wet courses of fill in the reconstruction of transitional roads, and should prewater areas targeted for road grading and ditch cleaning.

Mitigation Measures Recommended for Project Approval

Based on the discussion in the preceding section, the following mitigation measures are recommended for project approval. Measures which are outside the jurisdiction of the lead agencies are suggested to address significant cumulative air quality impacts.

Mitigation Measure AQ-1: Truck Emission Standards - Trucks used to haul solid waste to the transfer stations, and trucks used to haul solid waste to the landfill, shall comply with all applicable California motor vehicle pollution control regulations. All new trucks used to haul solid waste to the landfill, and purchased after the effective date of new, more stringent California motor vehicle pollution control regulations, shall comply with those regulations.

Implementing Agencies: California Air Resources Board
California Department of Motor Vehicles
California Highway Patrol

Mitigation Measure AQ-2: Diesel Fuel Quality - Trucks used to haul solid waste to the transfer stations, and trucks used to haul solid waste directly to the landfill, shall use Diesel fuel which complies with all applicable California Air Resources Board regulations for on-highway Diesel motor vehicle fuel.

Implementing Agencies: California Air Resources Board

Mitigation Measure AQ-3: South Coast Air Quality Management District Smoke Enforcement Program - Trucks used to haul solid waste to the transfer stations, and trucks used to haul solid waste to the landfill, shall be subjected to random checks for excessive smoke by the California Highway Patrol.

Implementing Agencies: California Highway Patrol
South Coast AQMD

Mitigation Measure AQ-4: California Highway Patrol Diesel Truck Inspection Program - Trucks used to haul solid waste to the transfer stations, and trucks used to haul solid waste to the landfill, shall be subjected to periodic checks for excessive smoke and emissions control system tampering at California Highway Patrol weight and safety inspection stations.

Implementing Agencies: California Highway Patrol
California Air Resources Board

Mitigation Measure AQ-5: State Low Emission Vehicle Regulations - Trucks used to haul solid waste to the transfer stations, and trucks used to haul solid waste to the landfill, shall be low emission vehicles as defined in state regulations, to the extent required by regulations of the California Air Resources Board and the South Coast Air Quality Management District (such as proposed Rule 1601).

Implementing Agencies: South Coast AQMD
California Air Resources Board
California Department of Motor Vehicles

Mitigation Measure AQ-6: Locomotive Operating Procedures - Mine Reclamation Corp. shall ensure that Diesel locomotives on the Eagle Mountain railway are shut down when the engines will not be needed for one hour or more. Mine Reclamation Corporation shall ensure that Diesel locomotives on the Eagle Mountain railway receive regular preventive maintenance, in accordance with the engine manufacturers' recommendations. This maintenance will include daily visual checks for excessive smoke by the engineers, and smoke measurements with an end-of-stack opacity meter of each engine at each scheduled maintenance interval, and at each

771

unscheduled maintenance event. Locomotives which are observed to have excessive opacity, in excess of 20%, shall be removed from service and adjusted and/or repaired within three working days of the observation. A record of all visual and instrument checks for excessive smoke, as well as associated repairs, shall be maintained by Mine Reclamation Corporation along with the routine maintenance logs for each engine.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-7: Diesel Fuel for Locomotive Operations - All Diesel locomotives on the Eagle Mountain railway shall be fueled with Diesel fuel which meets the requirements of the California Air Resources Board for on-highway motor vehicle Diesel fuel. Mine Reclamation Corporation shall maintain a record of all Diesel fuel purchases which includes a statement by the supplier that the fuel complies with this requirement.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-8: Diesel Locomotive Emission Standards - All Diesel locomotive engines purchased by Mine Reclamation Corporation for use on the Eagle Mountain railway shall comply with all applicable state and federal emission control requirements.

Implementing Agencies: U.S. Environmental Protection Agency
California Air Resources Board

Mitigation Measure AQ-9: Diesel Locomotive Low Emission Retrofits - Prior to the commencement of routine operations on the Eagle Mountain railway, Mine Reclamation Corporation shall prepare, or have prepared, a study comparing the relative costs of modifying the existing Kaiser Diesel locomotive engines to reduce their oxides of nitrogen emissions, or purchasing replacement Diesel engines, such that their oxides of nitrogen emissions are not greater than approximately 6 grams per brakehorsepower-hour at maximum rated load. Upon completion of this study, Mine Reclamation Corporation shall modify the existing Kaiser Diesel locomotive engines to achieve the lower NOx level, or shall replace existing engines which new engines which achieve the lower NOx level.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-10: Electrification of the Eagle Mountain Railway - When landfill gas generation is sufficient to warrant the construction of an energy recovery facility at the project site, Mine Reclamation Corporation shall prepare, or have prepared, a study of the cost/effectiveness of electrifying the

Eagle Mountain railway to reduce emissions from locomotive emissions.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

<u>Mitigation Measure AQ-11: Landfill Equipment Operating Procedures</u> - Mine Reclamation Corporation should ensure that equipment operators at the landfill shut down their engines if the equipment will be idle for fifteen minutes or longer. Mine Reclamation Corporation should schedule the number of machines and operators to match the anticipated waste volumes, and should match the number of container haulers to the container handling capacity to avoid excessive queueing.

Mine Reclamation Corporation should ensure that Diesel fueled equipment at the landfill receive regular preventive maintenance, in accordance with the engine manufacturers' recommendations. This maintenance should include daily visual checks for excessive smoke by the operations or maintenance staff. Equipment which is observed to have excessive opacity, in excess of 20%, shall be removed from service at the end of the next work shift, and adjusted and/or repaired within three working days of the observation. A record of all visual and instrument checks for excessive smoke, as well as related repairs, shall be maintained by Mine Reclamation Corporation along with the routine maintenance logs for each item of equipment.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

<u>Mitigation Measure AQ-12: Diesel Fuel for Landfill Equipment</u> - All Diesel-fueled equipment at the landfill should be fueled with Diesel fuel which meets the requirements of the California Air Resources Board for on-highway motor vehicle Diesel fuel. Mine Reclamation Corporation should maintain a record of all Diesel fuel purchases which includes a statement by the supplier that the fuel complies with this requirement.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

<u>Mitigation Measure AQ-13: On-Highway Engines for Landfill Equipment</u> - Prior to purchasing any Diesel-fueled equipment for operation at the landfill, Mine Reclamation Corporation should evaluate the feasibility of purchasing the equipment with engines which are certified by the California Air Resources Board for use in on-highway trucks. If such engines are available, Mine Reclamation Corporation should purchase the equipment with equivalent on-highway engines, unless (1) there is no suitable engine available; or (2) the mounting and installation requirements, or duty cycle limitations, make it infeasible to use available on-highway engines in that equipment.

72

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-14: Low NOx Engine Design for Landfill Equipment - For any Diesel-fueled landfill equipment for which there are no suitable on-highway equivalent engines, Mine Reclamation Corporation should purchase the equipment with engines which are equipped with turbochargers and intercoolers (or aftercoolers). In addition, Mine Reclamation Corporation should maintain these engines with the fuel injection timing retarded to a level recommended by the engine manufacturer for reduced NOx emissions, but which will not result in excessive visible smoke emissions.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-15: Construction Equipment Emission Standards - Mine Reclamation Corporation should ensure that all landfill equipment which it purchases complies with all applicable federal and state emission control standards.

Implemented by: California Air Resources Board
U.S. Environmental Protection Agency

Mitigation Measure AQ-16: Electrification of Landfill Equipment - Mine Reclamation Corporation should purchase and operate electric versions of the following equipment, in lieu of Diesel (or other) fueled versions at the landfill site:

- container loading/unloading cranes
- pug mills used for liner material preparation
- crushers used for liner material preparation
- conveyors for transporting cover material 75% of the distance from the preparation area to the landfill face.

Implemented by: Mine Reclamation Corp.
Monitored by: Riverside County

Mitigation Measure AQ-17: Control of Flare Emissions - When the flare gas generation rate exceeds five million cubic feet per day, Mine Reclamation Corp. shall conduct an analysis of the technical and economic feasibility of recovering energy from the flared landfill gas. If the analysis indicates that energy recovery is feasible, Mine Reclamation Corp. shall take the steps necessary to design, permit, and construct the energy recovery facilities before the landfill gas generation rate exceeds 10 million cubic feet per day.

If the analysis indicates that energy recovery is not feasible and the landfill gas generation rate exceeds eight million cubic feet, Mine Reclamation Corp. shall take the steps necessary to retrofit an oxidation catalyst system to the flares which is capable of achieving at least an 80% reduction in carbon monoxide emissions and a 50% reduction in non-methane hydrocarbon emissions. The oxidation catalyst system shall be installed and operating before the landfill gas generation rate exceeds 10 million cubic feet per day.

In the event that an oxidation catalyst system is not commercially available at that time, Mine Reclamation Corp. shall submit revised applications to the air pollution control agencies reflecting the higher carbon monoxide and non-methane hydrocarbon emission rates from the flares.

If an energy recovery facility is not constructed and the landfill gas generation rate exceeds 45 million cubic feet per day, Mine Reclamation Corp. shall take the steps necessary to retrofit a urea injection system (or equivalent system) capable of achieving at least a 30% reduction in oxides of nitrogen emissions. The urea injection system shall be installed and operating before the landfill gas generation rate exceeds 50 million cubic feet per day.

Implemented by:	Mine Reclamation Corp.
Monitored by:	South Coast AQMD
	U.S. Environmental Protection Agency

<u>Mitigation Measure AQ-18: Temporary Road Surfaces</u> - Mine Reclamation Corp. shall apply water as a dust suppressant to all road surfaces during construction operations sufficient to maintain nominal surface moisture contents above 4%. In addition, for all road surfaces or staging areas which are used during normal project operations for a period of thirty days or less, Mine Reclamation Corp. shall apply water as a dust suppressant sufficient to maintain nominal surface moisture contents above 4%.

Implemented by:	Mine Reclamation Corp.
Monitored by:	South Coast AQMD
	Riverside County

<u>Mitigation Measure AQ-19: Transitional Road Surfaces</u> - For all road surfaces, excluding construction roads, which are used during normal operations for a period of more than thirty days, but which are periodically reconstructed or relocated, Mine Reclamation Corp. shall apply chemical dust suppressants on a base of compacted coarse tailing to minimize fugitive dust emissions. The chemical dust suppressant shall be selected based on a field evaluation of candidate suppressants conducted upon startup of the project.

<u>Mitigation Measure AQ-20: Permanent Road Surfaces</u> - Mine Reclamation Corp. shall pave all onsite roads which will be fixed in their locations for the life of the project. These roads

73

shall be periodically cleaned with mechanical sweepers to minimize the buildup of loose surface material.

Mitigation Measure AQ-21: Tailing Excavation - Mine Reclamation Corp. shall pre-water tailing piles prior to excavation.

If necessary and effective, Mine Reclamation Corp. shall apply water as a dust suppressant to processed coarse tailing prior to their loadout into haul trucks.

Mitigation Measure AQ-22: Miscellaneous Fugitive Dust Sources - Mine Reclamation Corp. shall apply water as a dust suppressant prior to clearing material from pit benches, excavating landfill gas collection pipe ditches, during reconstruction of transitional roads, and during any other operations which could result in visible fugitive dust emissions which can be seen from locations outside the project boundary.

Mitigation Measure AQ-23: Weather Data Collection/Revised Air Quality Modeling Analysis - Prior to the receipt of waste material for disposal at the landfill site, Mine Reclamation Corp. shall complete the acquisition of at least twelve months of valid meteorological data at the site. The data shall be collected in accordance with a monitoring plan reviewed and approved by the South Coast Air Quality Management District and the Environmental Protection Agency.

Prior to the receipt of waste material for disposal at the landfill site, Mine Reclamation Corp. shall complete a revised air quality modeling analysis and screening level health risk assessment analysis using site specific meteorological data. If this analysis indicates that there is a potential for significant adverse impacts due to operation of the facility, Mine Reclamation Corp. shall develop and submit for approval additional mitigation strategies which will reduce remaining significant impacts, if any, to levels of insignificance.

The following measures are not considered to be feasible at the present time, for the reasons discussed in the preceding sections:

- Use of catalytic trap oxidizers on new or existing Diesel locomotives;
- Use of selective catalytic reductions systems on new or existing Diesel locomotives;
- Use of alternative fuels such as methanol, LPG, or compressed natural gas in Diesel locomotives;
- Use of catalytic trap oxidizers on new Diesel fueled landfill equipment
- Use of alternative fuels such as methanol, LPG, or compressed natural gas in new Diesel fueled landfill equipment

However, should any of these technologies be required by applicable federal, state or local regulations, Mine Reclamation Corporation should take steps to comply with these regulations as expeditiously as possible.

Summary of Remaining Project Impacts After Mitigation

Table 34 shows the effect of the recommended mitigation measures on total project emissions; Table 35 presents the same information for the sources which under within the direct control of Mine Reclamation Corp. Figures 33 and 34 present the same data graphically.

The data show that the recommended mitigation measures have the greatest benefits for reducing emissions of oxides of nitrogen and sulfur dioxide. The oxides of nitrogen reductions are due to the use of low NOx emitting engines in locomotives and on-site landfill equipment, as well as the electrification of portions of the operation. The NOx reductions associated with the use of a urea injection system on the flare at maximum flare gas production levels are not shown as a credit in these tables, since they have been incorporated into the project design and are reflected in all estimates of project emissions. This is because it is anticipated that this level of control may be required by regulation at the future date.

The sulfur dioxide reductions are due to the use of ultra-low sulfur fuel in all Diesel burning equipment owned by Mine Reclamation Corp. The use of this fuel results in associated reductions in particulate matter emissions as well. The use of an electric conveyor to transfer cover material for a portion of the distance which would otherwise be traveled by trucks on transitional roads results in a further reduction in particulate emissions.

In addition, the project design reflects substantial reductions (up to 95%) in particulate emissions due to a variety of dust suppression techniques, since it is likely that these measures would be required in order to comply with South Coast Air Quality Management District requirements. Consequently, all estimates of project emissions (with and without mitigation) reflect these reductions.

Relatively small reductions in carbon monoxide and volatile organic compounds (hydrocarbons) are expected beyond those already included in the project design to ensure that flare gas emissions of that pollutant do not exceed applicable regulatory trigger levels. The remaining sources of carbon monoxide and VOC's are Diesel engines, which have inherently low levels of these pollutants.

Table 34

Eagle Mountain Project
Effect of Mitigation on Project Emissions
(tons/year)

Activity	NOx	CO	PM10	VOC	SO2
		Without Mitigation			
Transfer Stations	325	98	35	30	40
Trains	1986	803	56	181	277
On-Highway Trucks	189	89	27	29	39
On-Site Vehicle Exhaust	515	173	38	30	53
On-Site Fugitive Dust*			140		
Landfill Gas Flares*	216	149	123	154	57
Project Total, Without Mitigation	3231	1312	419	424	466
		With Mitigation			
Transfer Stations	252	109	22	23	20
Trains	1775	803	51	181	197
On-Highway Trucks	189	89	27	29	39
On-Site Vehicle Exhaust	292	130	18	19	9
On-Site Fugitive Dust*			125		
Landfill Gas Flares*	216	149	123	154	57
Project Total, With Mitigation	2724	1280	366	406	322
REDUCTION DUE TO MITIGATION:					
Tons	507	32	53	18	144
Percent	(16%)	(2%)	(13%)	(4%)	(31%)

*Project design incorporated mitigation measures; see text for details.

Table 35

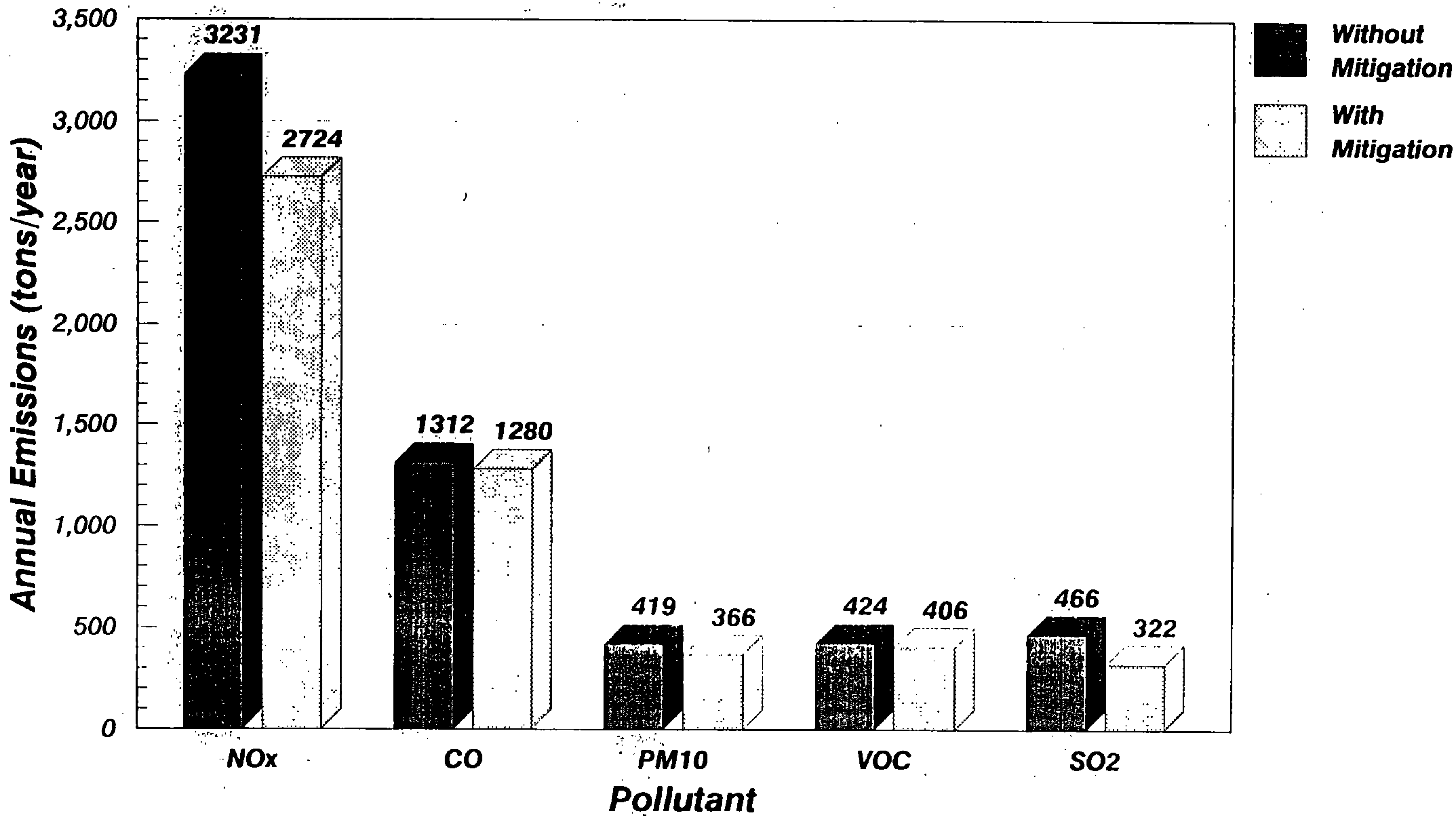
Eagle Mountain Project
Effect of Mitigation on Emissions
from Sources Owned by Mine Reclamation Corp.
(tons/year)

Activity	NOx	CO	PM10	VOC	SO2
			Without Mitigation		
Trains	504	203	21	79	89
On-Site Vehicle Exhaust	515	173	38	30	53
On-Site Fugitive Dust*			140		
Landfill Gas Flares*	216	149	123	154	57
Total, Without Mitigation	1235	525	322	263	199
			With Mitigation		
Trains	294	203	17	79	9
On-Site Vehicle Exhaust	292	130	18	19	9
On-Site Fugitive Dust*			125		
Landfill Gas Flares*	216	149	123	154	57
Total, With Mitigation	802	482	283	252	75
REDUCTION DUE TO MITIGATION					
Tons	433	43	39	11	124
Percent	(35%)	(8%)	(12%)	(4%)	(62%)

*Project design incorporated mitigation measures; see text for details.

75

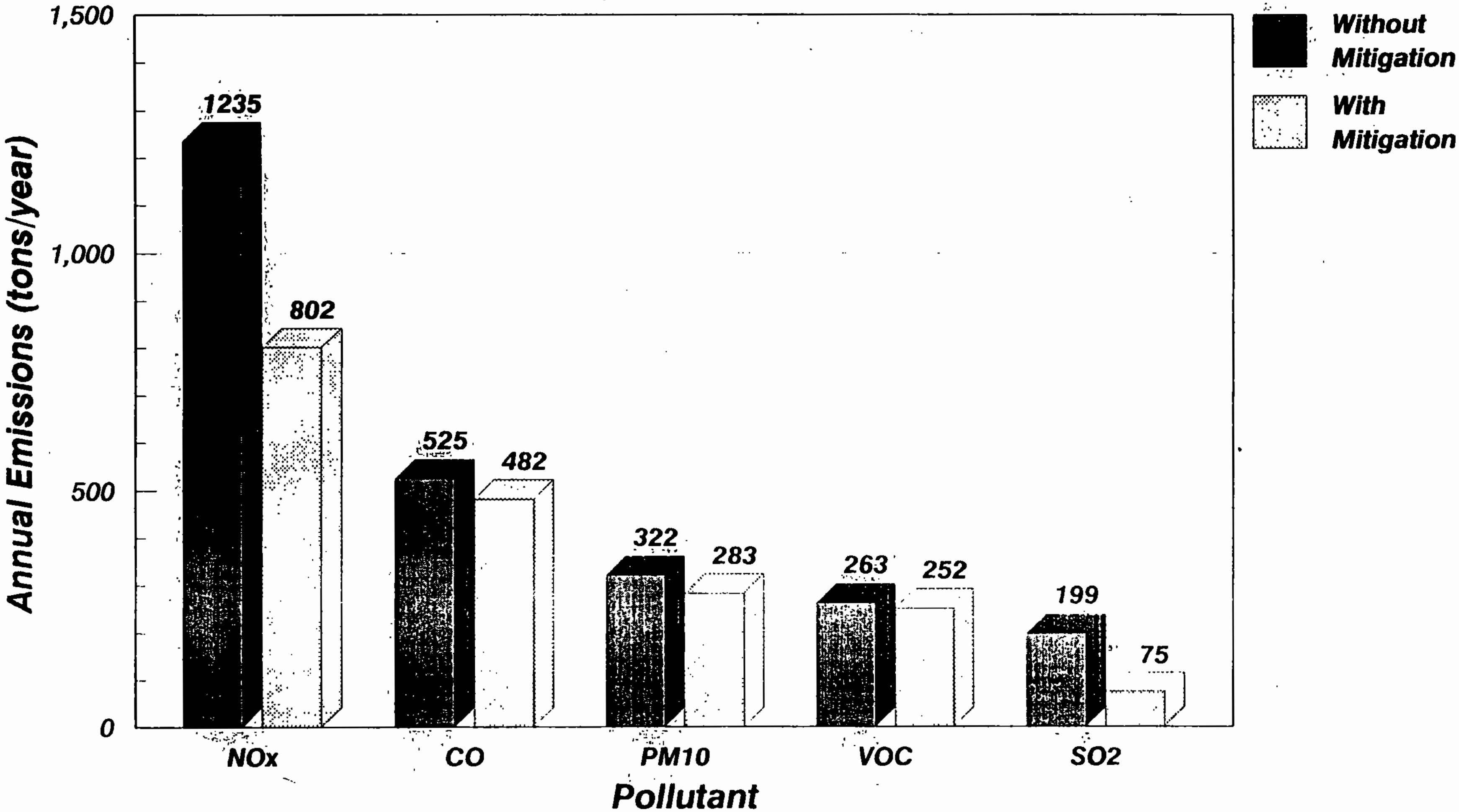
Figure 33
Eagle Mountain Project
Mitigation Benefits



Sierra Research
August 1990

Figure 34

Eagle Mountain Project
Mitigation Benefits - MRC Sources Only



Sierra Research
August 1990

96

Table 36 shows a re-analysis of the project's air quality impacts which reflect the mitigation measures. The data indicate that the state standard for nitrogen dioxide, and state and federal standards for fine particulates may still be exceeded. In addition, the analysis projects that Class I increments would still be exceeded for nitrogen dioxide, sulfur dioxide, and fine particulate matter.

As discussed earlier in this report, these analyses are conservative, and tend to substantially overestimate project impacts, particularly for longer averaging periods. However, in order to further narrow the area of concern, an additional analysis was performed without the flares. The results of this analysis are shown in Table 37.

The data indicate that all of the air quality standards and Class I increments would be achieved if the flares could be replaced with an alternative method of disposal, with the exception of the state and federal PM10 standards. Upon a re-analysis using actual weather data from the project site, further mitigation measures may be required. As discussed previously, each of these air quality impact analyses reflect a high degree of conservatism, including:

- maximum potential landfill gas generation rates which may never be reached in the project's dry, desert location;

- landfill operations, locations, and gas generation rates are based on projections 30 years (or more) in the future, but reflect only currently available air pollution control technologies;

- all of the air quality models were run in a screening mode, which results in worst case assumptions for weather and overestimates of pollutant concentrations, particularly for longer averaging periods.

Upon the collection of at least one year of actual weather data, the air quality modeling analysis should be performed again.

Table 36

Maximum Impact of Proposed Eagle Mountain Project
on Ambient Air Quality
(with mitigation)
(all concentrations in micrograms per cubic meter)

Pollutant/ Averaging Time	California Standards	National Standards	Maximum Offsite Concen-tration	Maximum Background (1986-88)	Maximum Cumulative Impact	Maximum Impact at Class I Area	Allowable Class I Area Increment
CO							
1-hour	23,000	40,000	186.7	14,950	15,137	----	----
*8-hour	10,000	10,000	130.7	6,344	6,475	----	----
NO2							
1-hour	470	---	283.5	207	491	----	----
*Annual	---	100	25.7	32	58	7.7	2.5
SO2							
1-hour	655	---	63.9	210	274	----	----
*3-hour	---	1300	57.5	---	---	17.6	25
*24-hour	131	365	25.2	58	83	7.8	5
*Annual	---	80	6.3	5	11	1.9	2
PM10							
*24-hour	50	150	72.9	368	441	17.7	10.0
*Annual	30	50	18.2	65	83	4.4	5.0

*For project impacts:
3-hour = 0.9 x 1 hour
8-hour = 0.7 x 1 hour
24-hour = 0.4 x 1 hour
annual = 0.1 x 1 hour

Table 37

Maximum Impact of Proposed Eagle Mountain Project
on Ambient Air Quality
(with mitigation; with no gas flaring)
(all concentrations in micrograms per cubic meter)

Pollutant/ Averaging Time	California Standards	National Standards	Maximum Offsite Concen- tration	Maximum Background (1986-88)	Maximum Cumulative Impact	Maximum Impact at Class I Area	Allowable Class I Area Increment
CO							
1-hour	23,000	40,000	86.8	14,950	15,037	----	----
*8-hour	10,000	10,000	60.8	6,344	6,405	----	----
NO2							
1-hour	470	---	197.7	207	405	----	----
*Annual	---	100	8.1	32	40	2.0	2.5
SO2							
1-hour	655	---	6.3	210	216	----	----
*3-hour	---	1300	5.7	---	---	1.4	25
*24-hour	131	365	1.0	58	59	0.3	5
*Annual	---	80	0.3	5	5	0.1	2
PM10							
*24-hour	50	150	72.9	368	441	3.6	10.0
*Annual	30	50	18.2	65	83	0.9	5.0

*For project impacts:
3-hour = 0.9 x 1 hour
8-hour = 0.7 x 1 hour
24-hour = 0.4 x 1 hour
annual = 0.1 x 1 hour

5) Assessment of Significance

Ozone - Table 38 compares the impacts of the Proposed Action with various significance criteria for ozone. In this table, hydrocarbon emissions are used to evaluate the significance of ozone impacts; there are no approved techniques available which can be used to estimate the change in ambient ozone concentrations due to any of the alternatives.

Compared with a baseline of zero emissions, the Proposed Action would be expected to have a significant impact on ozone, due to significant increases in hydrocarbon emissions.)

Within the South Coast Air Basin, the increases in emissions of hydrocarbons due to increased transport of waste are more than offset by the expected decrease in flare emissions. Consequently, the Proposed Action is expected to have a beneficial impact on hydrocarbon emissions within the South Coast Air Basin, while resulting in a significant increase in the Desert Air Basin. Since both regions experience violations of the state and federal ozone standards, the overall impacts for ozone would be considered significant for the Proposed Action.

Nitrogen Dioxide - Table 39 compares the impacts of the Proposed Action with various significance criteria for nitrogen dioxide. Once again, the Proposed Action is shown to result in significant impacts for this pollutant.

Carbon Monoxide - The impact of the Proposed Action on carbon monoxide is shown in Table 40. The data show that, compared with a baseline of zero emissions, the Proposed Action would have a significant impact on carbon monoxide. The Proposed Action would reduce carbon monoxide emissions in the South Coast Air Basin - where state and federal air quality standards are exceeded - while increasing emissions in the Desert areas which still meet the standards. Since the air quality modeling analyses in Section IV.B.4.c show that the Eagle Mountain Project would not result in a violation of any state or federal air quality standard for carbon monoxide, the overall impacts of the Proposed Action on carbon monoxide are expected to be insignificant, and beneficial within the South Coast Air Basin.

Sulfur Dioxide - Table 41 shows the impacts of the Proposed Action on sulfur dioxide. The data show that the Proposed Action would result in a significant impact for this pollutant.

Particulate Sulfates - Since particulate sulfates are formed in the atmosphere from emissions of sulfur dioxide, conclusions regarding the significance of sulfur dioxide impacts would be applicable to sulfates as well.

Table 38

Assessment of Significance for Ozone
Eagle Mountain Project

Measure of Significance	Level	Project Without Mitigation	Project With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,326	2,225
AQMD major NSR	100 tons/year	424	406
AQMD major PSD	25 tons/year	424	406
AQMD sig incr PSD	25 tons/year	424	406
EPA major source	100 tons/year	424	406
EPA major mod	40 tons/year	424	406
Ozone Measurement Accuracy and Reporting Precision			
ARB accuracy	0.54 pphm		
ARB reporting	1 pphm		
Other Measures			
Zero molecule	0 lbs/day	2,326	2,225

Table 39

Assessment of Significance for Oxides of Nitrogen
Eagle Mountain Project

Measure of Significance	Level	Project Without Mitigation	Project With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	17,699	14,927
AQMD major NSR	100 tons/year	3,231	2,724
AQMD major PSD	25 tons/year	3,231	2,724
AQMD sig incr PSD	25 tons/year	3,231	2,724
EPA major source	100 tons/year	3,231	2,724
EPA major mod	40 tons/year	3,231	2,724
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	10 ug/m3 ann	27	26
EPA Class I ann	10 ug/m3 ann	27	26
EPA de minimum ann	14 ug/m3 ann	27	26
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.18 pphm 1-hr	18	15
ARB report 1h	1 pphm 1-hr	18	15
ARB report ann	0.1 pphm ann	1.4	1.4
Other Measures			
Zero molecule	0 lbs/day	17,699	14,927

19

Table 40

Assessment of Significance for Carbon Monoxide
Eagle Mountain Project

Measure of Significance	Level	Project Without Mitigation	Project With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	7,189	7,013
AQMD major NSR	100 tons/year	1,312	1,280
AQMD major PSD	25 tons/year	1,312	1,280
AQMD sig incr PSD	25 tons/year	1,312	1,280
EPA major source	100 tons/year	1,312	1,280
EPA major mod	40 tons/year	1,312	1,280
Concentration Based Measures - Industrial Sources			
EPA Class I 24 hr	1 ug/m3 24-hr	75	75
EPA de minimus 8h	575 ug/m3 8-hr	132	131
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.02 ppm 1-hr	0.16	0.16
ARB report 1h	1 ppm 1-hr	0.16	0.16
ARB report 8h	0.1 ppm 8-hr	0.12	0.12
Other Measures			
Zero molecule	0 lbs/day	7,189	7,013

Table 41

Assessment of Significance for Sulfur Dioxide
Eagle Mountain Project

Measure of Significance	Level	Project Without Mitigation	Project With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,554	1,763
AQMD major NSR	100 tons/year	466	322
AQMD major PSD	25 tons/year	466	322
AQMD sig incr PSD	25 tons/year	466	322
EPA major source	100 tons/year	466	322
EPA major mod	40 tons/year	466	322
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	2 ug/m3 ann	7	6
AQMD Class I 24h	5 ug/m3 24-hr	26	25
AQMD Class I 3h	25 ug/m3 3-hr	64	58
EPA Class I ann	2 ug/m3 ann	7	6
EPA Class I 24h	5 ug/m3 24-hr	26	25
EPA Class I 3h	25 ug/m3 3-hr	64	58
EPA de minimus 24h	13 ug/m3 24-hr	26	25
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.33 pphm 1-hr	2.7	2.4
ARB reporting 1h	1 pphm 1-hr	2.7	2.4
Other Measures			
Zero molecule	0 lbs/day	2,554	1,763

80

Fine Particulates - The impacts on fine particulates of the Proposed Action is shown in Table 42. Once again, the data show that the Proposed Action results in significant impacts for this pollutant.

For this pollutant, the shift in landfill operations outside of the South Coast Air Basin results in a decrease in emissions which outweighs the increase due to transportation; consequently, the Proposed Action would result in a net air quality benefit within the South Coast Air Basin. However, given the fact that both the Basin and Desert portions of Southern California exceed state and federal air quality standards for fine particulates, the overall impacts would still be considered significant.

Regional Visibility - Regional visibility is affected by emissions of hydrocarbons, oxides of nitrogen, sulfur dioxide, and particulate matter. Based on the analyses contained in preceding sections, the Proposed Action would be expected to have a significant effect on regional visibility. Overall, the Proposed Action would be expected to result in a slight benefit in regional visibility in the South Coast Air Basin, and an adverse impact in the desert areas.

Acid Deposition - Acid deposition in California results from pollutants formed from oxides of nitrogen and sulfur oxides emissions. Based on the analyses contained in the preceding sections, the Proposed Action would be expected to have a significant effect on acid deposition.

Toxic Air Pollutants - The screening level risk assessment shown in Section II.4.A.2) indicates that the risk from toxic air contaminants associated with the Eagle Mountain Project is greater than the 1 in a million level which is typically assumed to represent a significant impact. Although the analyses presented in this report assume that landfill gas generation rates would be the same for both in-basin and desert sites, the drier climate and lower moisture content in the waste would be expected to result in lower generation rates for the Proposed Action. The lower gas generation rates would result in less flaring, which in turn would mean lower emissions of toxic air contaminants.

Based on all of these factors, a significant impact is expected from toxic air contaminants, and further health risk assessments and mitigation measures should be required.

Global Warming - "Greenhouse" gases which could contribute to the global warming effect are generated by the operation of landfill equipment; the flaring of landfill gases; and the transportation of waste material. The Proposed Action would result in the generation of gases which could contribute to global warming. However, the state of knowledge regarding global warming is not adequate to allow an assessment of the significance of the impacts of any individual project at the present time.

Table 42

Assessment of Significance for Fine Particulates (PM10)
Eagle Mountain Project

Measure of Significance	Level	Project Without Mitigation	Project With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,301	2,009
AQMD major NSR	100 tons/year	419	366
AQMD major PSD	25 tons/year	419	366
AQMD sig incr PSD	25 tons/year	419	366
EPA major source	100 tons/year	419	366
EPA major mod	40 tons/year	419	366
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	5 ug/m3 ann	19	18
AQMD Class I 24h	10 ug/m3 24-hr	77	73
EPA Class I ann	5 ug/m3 ann	19	18
EPA Class I 24h	10 ug/m3 24-hr	77	73
EPA de minimus 24h	10 ug/m3 24-hr	77	73
Measurement Accuracy and Reporting Precision			
ARB accuracy 24h	1.2 ug/m3 24-hr	77	73
ARB reporting 24h	1 ug/m3 24-hr	77	73
ARB reporting ann	0.1 ug/m3 ann	19	18
Other Measures			
Zero molecule	0 lbs/day	2,301	2,009

Overall Assessment of Significance

Based on the analyses contained in the preceding sections, the Proposed Action would be expected to have a significant effect on air quality. However, the Proposed Action could result in air quality benefits in the South Coast Air Basin for ozone, carbon monoxide, and particulate matter, at the expense of increased impacts in desert areas. The improvements in South Coast Air Basin would pass through to the desert areas over the San Gorgonio Pass; however, these benefits would not be sufficient to outweigh the direct adverse impacts in the desert.

B. Reduced Operations Alternative

1) Emissions Impacts

Emissions from the Reduced Operations Alternative will be associated with the same activities as the Proposed Action, although to a lesser extent. These activities will occur both offsite, such as the operation of urban transfer stations, and on-site, including all of the operations at the Eagle Mountain site. They will involve both stationary sources, such as the landfill gas flares, and mobile equipment, such as the trains hauling waste. By emission type, project sources can be grouped into four classes: motor vehicles, fugitive dust sources, fugitive vapor sources, and stationary combustion sources. Motor vehicles include train locomotives, on-highway haul trucks, and off-highway highway equipment. Fugitive dust sources include short-term construction activities, landfill road use, mine tailing reclamation, and solid waste covering. Fugitive vapor sources include the landfill, and stationary combustion sources include the landfill gas flares.

Motor vehicles will generate "tailpipe" emissions and, in the case of on-site vehicles, fugitive dust from unpaved roads and cover material handling. Processing of daily cover material will produce particulate emissions as ore tailing are reclaimed by screening and crushing. As the refuse begins to decompose, gas will be generated by the anaerobic activity in the landfill. The gas will consist primarily of methane and carbon dioxide with trace concentrations of other substances either produced by the bacterial activity or evaporated from materials disposed of in the landfill. The gas will be collected through a series of underground pipes and will be disposed of by flaring. The burning of the landfill gas in flares will result in the production of combustion emissions. Each of these sources is discussed in more detail below.

Construction Operations

The emissions associated with construction of the Reduced Operations Alternative will be the same as those described in Section II.4.A.1) for the Proposed Action.

Transfer Stations

The basic transfer station operations under the Reduced Operations Alternative would be the same as those described in Section II.4.A.1) for the Proposed Action. Equipment activity rates, emission factors, and daily emissions for a typical transfer station will be the same as those shown previously in Table 19 for the Proposed Action. However, under the Reduced Operations Alternative, only five transfer stations will be needed. Total emissions from the five stations are shown in Table 43.

Solid Waste Transport

Under the Reduced Operations Alternative, solid waste will be transported to Eagle Mountain by two modes: trains and trucks. Approximately 88% of the waste will be transported by train, primarily from the Los Angeles basin, while the remainder will be hauled from central or eastern Riverside County by truck. Waste will arrive at Eagle Mountain in 20-25 ton containers compacted at urban transfer sites. Both transportation modes will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines.

The configurations of trains and trucks will be the same under the Reduced Operations Alternative as described above for the Proposed Action; however, fewer train and truck deliveries would occur.

A summary of fuel use and emissions for train operations under the Reduced Operations Alternative is shown in Table 44. This represents an average day with 4.1 trains making the round trip.

Under the Reduced Operations Alternative, an estimated 12% (2000 tons per day) of waste will be transported to the project site by on-highway trucks. It is anticipated that within 75 miles driving distance from the project, the cost of transporting solid waste in containers from transfer stations using tractor-trailers will be less expensive than shipping it by rail. As a result, up to 50 trucks will make two trips per day to the project site with 20-25 ton loads. An analysis of the emissions from this activity, calculated at a maximum daily trip distance of 300 miles per truck, appears in Table 45.

On-Site Material Handling (except Fugitive Dust)

As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment consumes nearly 6,600 gallons of diesel fuel per day. About 28% of this fuel is consumed by the fleet of trucks which will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations. The emission rates of equipment grouped within these categories are listed in Table 46.

32

Table 43

Eagle Mountain Project
Transfer Station Emissions (Total)
Reduced Operations Alternative Without Mitigation

Vehicle Type	Number	Hr/Day	Fuel Gal/Hr
Rubber-tired Loader	14	20	6
Container Handler	6	20	6
Train Car Spotter	2	5	7

	Emission Factors (lb/1000 gal)*				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	325.18	81.00	31.70	23.48	33.54
Container Handler	325.18	81.00	31.70	23.48	33.54
Train Car Spotter	466.05	287.22	49.70	68.87	33.30

Vehicle Type	Number	Mileage Per Day
Transfer Truck/Trailer	21	450

	Emission Factors (gm/VMT)**				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Transfer Truck/Trailer	15.65	7.40	2.28	2.44	3.21

	Emissions (lb/day)				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	546.31	136.08	53.25	39.44	56.34
Transfer Truck/Trailer	326.13	154.09	47.42	50.90	66.89
Container Handler	234.13	58.32	22.82	16.90	24.15
Train Car Spotter	32.62	20.11	3.48	4.82	2.33
Total	1139.19	368.60	126.97	112.07	149.71

References:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

**California Air Resources Board's EMFAC7D/BURDEN7B models for 1995 calendar year, Southeast Desert Air Basin

Table 44

Eagle Mountain Project
Train Emissions - Average Operating Day
Reduced Operations Alternative Without Mitigation

System	Fuel Use (gal/locomotive)	Number of Locomotives	Fuel Use (gal/trip)
Southern Pacific			
Basin to Ferrum	489	4	1956
Ferrum to Basin	570	2	1140
		Total	3096
Eagle Mountain			
Ferrum to Landfill	403	3	1209
Landfill to Ferrum	83	3	249
		Total	1458

	Pollutant				
	NOX	CO	PM10	VOC	SO2
Southern Pacific					
Emission Factor (lb/1000 gal)*	558	226	13	38.4	71
Emissions (lb/train)	1728	700	40	119	220
Emissions (lb/day)	7105	2877	166	489	904
Emissions (tons/yr)	1297	525	30	89	165
Eagle Mountain					
Emission Factor (lb/1000 gal)^	403	162	17	63	71
Emissions (lb/train)	588	236	25	92	104
Emissions (lb/day)	2416	971	102	378	426
Emissions (tons/yr)	441	177	19	69	78
Total System					
Emissions (lb/train)	2315	936	65	211	323
Emissions (lb/day)	9521	3849	267	867	1330
Emissions (tons/yr)	1738	702	49	158	243

References:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), factors for mixed GE and EMD locomotives.

^"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), factors for GE locomotives.

Table 45

Eagle Mountain Project
Delivery Truck Emissions
Reduced Operations Alternative Without Mitigation

Truck Delivery Rate =	2000 tons/day
Truck Capacity =	20 tons/trip
Trip Length (round trip) =	150 miles
Total Haul Miles =	15000 miles/day

On-Highway Trucks	NOX	CO	PM10	VOC	SO2
Emission Factors, gm/VMT*	15.65	7.40	2.28	2.44	3.21
Total Emissions, lb/day	517.66	244.59	75.28	80.79	106.18
Total Emissions, ton/yr	94.47	44.64	13.74	14.75	19.38

Reference:

*California Air Resources Board's EMFAC7D/BURDEN7B models for 1995 calendar year, Southeast Desert Air Basin

TABLE 46

Eagle Mountain Project
Onsite Mobile Equipment Exhaust Emissions
Reduced Operations Alternative Without Mitigation

				Emission Factors (lb/1000 gal)*					Emissions (lb/day)				
	Number	Hr/Day	Fuel Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
CONTAINER HANDLING YARD	------	------	------	---	--	----	---	---	---	--	----	---	---
Overhead Crane	3	11	7	487.19	195.27	35.22	23.09	36.47	112.54	45.11	8.14	5.33	8.42
Container Handler	2	10	6	325.18	81.00	31.70	23.48	33.54	39.02	9.72	3.80	2.82	4.02
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
WASTE HAULING	------	------	------	---	--	----	---	---	---	--	----	---	---
Container Hauler	26	10	7	318.92	89.22	19.57	14.48	34.83	580.44	162.38	35.61	26.35	63.39
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
LANDFILL FACE	------	------	------	---	--	----	---	---	---	--	----	---	---
Crawler Tractor	8	10	14	258.27	64.57	27.00	14.48	33.30	289.26	72.31	30.24	16.22	37.30
Refuse Compactor	10	10	16	463.32	208.57	30.52	34.44	39.13	741.31	333.71	48.84	55.10	62.61
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
COVER EXCAVATION	------	------	------	---	--	----	---	---	---	--	----	---	---
Rubber-Tired Loader	2	10	11	325.18	81.00	31.70	23.48	33.54	71.54	17.82	6.97	5.17	7.38
	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
COVER HAULING	------	------	------	---	--	----	---	---	---	--	----	---	---
Off-Highway Truck	4	10	7	318.92	89.22	19.57	14.48	34.83	89.30	24.98	5.48	4.05	9.75
APPLICATION OF	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
DAILY COVER	------	------	------	---	--	----	---	---	---	--	----	---	---
Crawler Tractor	2	10	14	258.27	64.57	27.00	14.48	33.30	72.31	18.08	7.56	4.05	9.32

TABLE 46 (Continued)

Eagle Mountain Project
Onsite Mobile Equipment Exhaust Emissions
Reduced Operations Alternative Without Mitigation

			Fuel	Emission Factors (lb/1000 gal)*					Emissions (lb/day)				
DUST CONTROL AND ROAD MAINTENANCE	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
12,000-Gal Tanker	2	11	20	318.92	89.22	19.57	14.48	34.83	140.33	39.26	8.61	6.37	15.32
Motor Grader	2	10	7	279.40	60.26	24.65	14.09	34.20	39.12	8.44	3.45	1.97	4.79
LINER CONSTRUCTION	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Frontend Loader	1	8	5	325.18	81.00	31.70	23.48	33.54	13.01	3.24	1.27	0.94	1.34
Pugmill	1	8	10.5	392.10	178.83	35.22	43.04	36.47	32.94	15.02	2.96	3.62	3.06
Dump Truck	1	8	6	318.92	89.22	19.57	14.48	34.83	15.31	4.28	0.94	0.69	1.67
Crawler Tractor	1	8	6	258.27	64.57	27.00	14.48	33.30	12.40	3.10	1.30	0.69	1.60
Compactor	1	8	6	463.32	208.57	30.52	34.44	39.13	22.24	10.01	1.47	1.65	1.88
BENCH CLEARING	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Crawler Tractor	1	8	6	258.27	64.57	27.00	14.48	33.30	72.31	18.08	7.56	4.05	9.32
MISCELLANEOUS	Number	Hr/Day	Gal/Hr	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Backhoe	1	2	3	466.05	287.22	49.70	68.87	33.30	2.80	1.72	0.30	0.41	0.20
Utility Truck	1	2	5	318.92	89.22	19.57	14.48	34.83	3.19	0.89	0.20	0.14	0.35
Grader	1	2	5	279.40	60.26	24.65	14.09	34.20	2.79	0.60	0.25	0.14	0.34
						GRAND TOTAL, lb/day			2352.1	788.8	174.9	139.8	242.1
							tons/yr		429.3	143.9	31.9	25.5	44.2

Reference:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

At the peak of landfill activity, container haul trucks will be in almost constant motion. The disposal of 16,000 tons of solid waste in 20-25 ton containers will require 640-660 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 26 trucks will each complete a circuit of loading and dumping every 24 minutes.

All other sources of emissions associated with on-site material handling would be the same as those described previously for the Proposed Action. However, the level of emissions from these activities would be reduced to the levels shown in Table 46 under the Reduced Operations Alternative.

Landfill Gas Generation and Combustion

Estimates of landfill gas generation, and associated emissions impacts, are the same for the Reduced Operations Alternative as for the Proposed Project. These estimates are discussed in Section II.4.A.1).

Fugitive Dust

Fugitive dust emissions from the Reduced Operations Alternative involve the same types of activities as discussed in Section II.4.A.1) for the Proposed Action, but will occur to a lesser degree.

A summary of computed fugitive dust emissions under the Reduced Operations Alternative is shown in Table 47.

Overall Project Impacts - Emissions

Total emissions from all sources under the Reduced Operations Alternative at maximum projected operating levels are shown in Table 48. These emission levels include controls that the project must incorporate in order to comply with South Coast Air Quality Management District and U.S. Environmental Protection Agency emission standards. The emissions are reported in terms of pounds per day and tons per year.

TABLE 47

Eagle Mountain Project
Fugitive Dust Emissions
Reduced Operations Alternative Without Mitigation

Activity	Annual Process Rate	Process Rate Units	Emission Factor* (lb/unit)	Control Factor* (%)	TSP Emission Rate (lb/hr)	PM10 Factor* (%)	PM10 Emission Rate (lb/hr)	PM10 Emission Rate (lb/day)	PM10 Emission Rate (ton/yr)
Waste Hauling	1146703	VMT	9.50	95%	149.16	0.22	32.82	328.16	59.89
Cover Excavation	3650	hr	5.70	90%	0.57	0.13	0.08	0.75	0.14
Cover Processing	1752000	ton	0.27	89%	14.53	0.52	7.61	76.14	13.90
Truck Loading	1752000	ton	0.01	0%	5.088	0.50	2.54	25.44	4.64
Cover Hauling	172624	VMT	16.80	95%	39.72	0.22	8.74	87.39	15.95
Cover Dumping	1752000	ton	0.01	0%	5.09	0.50	2.54	25.44	4.64
Cover Spreading	3650	hr	5.70	0%	5.70	0.13	0.75	7.50	1.37
Road Watering	56210	mi	9.38	90%	13.13	0.22	2.89	31.78	5.80
Road Grading	14600	mi	0.23	50%	0.45	0.54	0.24	2.44	0.45
Liner Excavation	2920	hr	34.23	90%	3.42	0.28	0.96	7.70	1.41
Liner Hauling	43800	VMT	9.38	90%	14.07	0.22	3.10	24.76	4.52
Bench Clearing	2920	hr	13.10	30%	9.17	0.16	1.48	11.87	2.17
Backhoe	730	hr	0.04	30%	0.03	0.76	0.02	0.04	0.01
Utility Truck	730	mi	3.79	90%	0.38	0.22	0.08	0.17	0.03
Grader	730	hr	0.23	50%	0.11	0.54	0.06	0.12	0.02
Windblown Fugitive Dust					0.00			0.18	0.03
			TOTALS		260.6		63.9	629.9	115.0

Table 47 (continued)
Footnotes

1. Waste Hauling, Cover Hauling, Road Watering, Liner Hauling, and Utility Truck Use: The emission factors are computed from AP-42 "Compilation of Air Pollutant Emission Factors", 11.2.6-1 (Industrial Paved Roads), using unpaved entry areas (multiplier = 7), 4 traffic lanes, 6% silt fraction, 5900 lb/mile surface dirt loading, and vehicle weights of 43 (waste hauling, road watering, and liner hauling), 94 (cover hauling), and 8 (utility truck use) gross tons loaded (for 50% of travel) and 18 (waste hauling, road watering, and liner hauling), 44 (cover hauling), and 8 (utility truck use) gross tons empty (for 50% of travel). The control efficiency is computed from EPA-450/3-88-008 "Control of Open Fugitive Dust Sources" with 0.80 mm/hr evaporation rate, 80 vehicle/hr traffic flow, 60 minute application interval, 3.00 gal/yd2 application rate for road watering, or sufficient watering to raise surface moisture content from 1% to 5%, or (from EPA-600/2-87-102 "Evaluation of the Effectiveness of Chemical Dust Suppressants on Unpaved Roads) monthly application of 0.30 gallons/yd2 of a 5:1 solution of water and Soil Cement. The PM10 conversion factor is from AP-42, 11.2.6-3 (Industrial Paved Roads).

2. Cover Excavation, Cover Spreading, Liner Excavation, and Bench Clearing: The emission factors are computed from AP-42, 8.24-5 (Western Surface Coal Mines, bulldozing overburden) with 1.0% (cover excavation and cover spreading), 20% (liner excavation), and 2% (bench clearing) silt contents (estimated from discussions with facility personnel) and 1% (cover excavation, cover spreading, and bench clearing) and 4% (liner excavation) moisture contents (estimated). The control factors are estimated from field data collected during the excavation of tailings at a former asbestos mine near Copperopolis, California. The PM10 conversion factor is computed from AP-42, 8.24-5 (Western Surface Coal Mines, bulldozing overburden).

3. Cover Processing: The emission factor is computed as the sum of emission factors for the stationary equipment included in the cover processing operation: 0.12 pounds/ton - dump hopper (from AP-42, 8.24-3, Metallic Minerals, dry transfer), 0.01 pounds/ton - belt transfer at base of dump hopper (from AP-42, 11.2.3-3, Aggregate Handling and Storage Piles, with 7.5 mph average wind and 1% moisture content), 0.02 pounds/ton - cone crusher (from AP-42, 8.19.2-4, Crushed Stone primary crushing at 1.5% moisture content), and 0.12 pounds/ton - pile stacker (from AP-42, 8.24-3, Metallic Minerals dry transfer). The average wind speed is taken from ARB's "California Surface Wind Climatology" for Desert Center and the moisture contents are estimated. The control efficiency is computed as a composite weighted by emissions from each of the stationary sources: 80% - dump hopper (estimated from vendor literature and inspection of hoppers equipped with hollow cone spray nozzles), 99% - belt transfer and cone crusher (estimated from vendor literature and MD-20 "Control of Particulate Emissions" for pulse-jet baghouses), 95% - pile stacker (estimated from vendor literature and inspection of stackers with drop height controllers,

Table 47 (continued)
Footnotes

midbelt deluge sprays, and head pulley solid cone nozzles). The PM10 conversion factor is an emission-weighted average covering each item of stationary equipment: 50% - dump hopper (from ARB "Information for Applying the State Ambient Air Quality Standards for PM10 to the Permitting of New and Modified Stationary Sources"), 100% - belt transfer and cone crusher (all emissions from baghouse assumed to be PM10), 60% - pile stacker (from AP-42, 8.23-4, Metallic Minerals, transfer of material with 4.0% moisture content).

4. Truck Loading, Cover Dumping: The emission factors are computed from AP-42, 11.2.3-3 (Aggregate Handling and Storage Piles), with 7.5 mph average wind speed (ARB, Desert Center) and 1% moisture content (estimated). The PM10 conversion factor is from the ARB PM10 permitting manual.

5. Road Grading, Backhoe Use, and Miscellaneous Grading: The emission factors are computed from AP-42, 8.24-5 (Western Surface Coal Mines, grading) with vehicle speeds of 2 mph (estimated for road and miscellaneous grading) and 1 mph (estimated for backhoe use). The control factors are estimated from EPA-450/3-88-008 with 0.80 water evaporation rate, 4 vehicle passes per hour, 8 hour water application interval, and 0.15 gallon/yd2 water application rate for road and miscellaneous grading, and are estimated from inspection of pipeline construction projects for backhoe use. The PM10 conversion factor is from AP-42, 8.24-5 (Western Surface Coal Mines, grading).

Table 48

Eagle Mountain Project
Total Project Emissions
Reduced Operations Alternative Without Mitigation

	(lb/day)					(ton/yr)				
Activity	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Offsite Sources:										
Transfer Stations	1139	369	127	112	150	208	67	23	20	27
Trains	9521	3849	267	867	1330	1738	702	49	158	243
On-Highway Trucks	518	245	75	81	106	94	45	14	15	19
Subtotal, Offsite	11178	4463	469	1060	1586	2040	814	86	193	289
Onsite Sources:										
Onsite Vehicle Exhaust	2352	789	175	140	242	429	144	32	26	44
Onsite Fugitive Dust			630					115		
Landfill Gas Flares	1182	816	676	845	310	216	149	123	154	57
Subtotal, Onsite	3534	1605	1481	985	552	645	293	270	180	101
PROJECT GRAND TOTAL	14712	6068	1950	2045	2138	2685	1107	356	373	390

2) Project Impacts - Ambient Concentrations

Project Impacts Near the Landfill Site

Using the same methodology as for the Proposed Action, an analysis was performed of the impacts of the Reduced Operations Alternative on ambient concentrations of pollutants. This analyis was performed for the area surrounding the landfill site; for the boundary of the nearest Class I area, the Joshua Tree National Monument; and for a typical rail crossing in the South Coast Air Basin.

As discussed in Section II.4.A.2) above, all of the analyses described below were performed with a high degree of conservatism, with the result that the concentrations shown are much higher than the levels which would likely be experienced.

Table 49 presents the results of the air quality modeling analysis. As discussed above, the analysis was performed in a screening mode, with a high degree of conservatism. Consequently, actual project impacts would be expected to be significantly lower than those shown.

The data indicate that the project's unmitigated impacts would represent the following fractions of the most stringent ambient air quality standards for each pollutant:

Carbon Monoxide	1%
Nitrogen Dioxide	65%
Sulfur Dioxide	20%
Fine Particulates (PM10)	126%

These levels are predictions of the worst case project impacts at any location outside of the project boundary. These concentrations are projected, in the absence of mitigation measures, at a location towards the northwest corner of the community of Eagle Mountain. The analysis is based on the extreme worst case assumption that the elevation of the landfill has risen to near the rim of the present mine site, while the size of the tailing pile has been substantially reduced. Thus, these conditions would reflect worst case operations after at least 30 years of project operations.

Impact on Class I Areas

Table 49 also presents the results of the modeling analysis at the Joshua Tree boundary, and compares these values with the allowable Class I area "increments". (It is expected that the Reduced Operations Alternative would not be subject to a formal PSD review, since project emissions would be below the regulatory thresholds for review. However, these increments of allowable growth can be used as one basis to evaluate the significance of this Alternative's impacts.

The analysis indicates that, in the absence of mitigation, the impacts for this Alternative will exceed allowable increments at the

Table 49

Maximum Impact of Reduced Operations Alternative
on Ambient Air Quality
(without mitigation)
(all concentrations in micrograms per cubic meter)

Pollutant/ Averaging Time	California Standards	National Standards	Maximum Offsite Concen- tration	Maximum Background (1986-88)	Maximum Cumulative Impact	Maximum Impact at Class I Area	Allowable Class I Area Increment
CO							
1-hour	23,000	40,000	184.3	14,950	15,134	----	----
*8-hour	10,000	10,000	129.0	6,344	6,473	----	----
NO2							
1-hour	470	---	306.4	207	513	----	----
*Annual	---	100	26.8	32	59	8.0	2.5
SO2							
1-hour	655	---	69.8	210	281	----	----
*3-hour	---	1300	62.8	---	---	18.6	25
*24-hour	131	365	26.2	58	84	8.0	5
*Annual	---	80	6.5	5	12	2.0	2
PM10							
*24-hour	50	150	63.2	368	431	17.7	10.0
*Annual	30	50	15.8	65	81	4.4	5.0

*For project impacts:
3-hour = 0.9 x 1 hour
8-hour = 0.7 x 1 hour
24-hour = 0.4 x 1 hour
annual = 0.1 x 1 hour

Joshua Tree boundary for all three pollutants for which increments have been established: nitrogen dioxide, sulfur dioxide, and fine particulates (PM10). As in the case of the Proposed Action, this conclusion will probably change upon a re-analysis using actual weather data from the project site.

Cumulative Impacts at the Project Site

The data indicate that, in the absence of mitigation measures, the Reduced Operations Alternative could result in exceedances of the state air quality standards for nitrogen dioxide and fine particulate matter. Emissions of carbon monoxide and sulfur dioxide are not expected to results in violations of air quality standards for those pollutants, even in combination with emissions from other sources.

Impacts at Typical Rail Crossings

Impacts at typical rail crossings under the Reduced Operations Alternative would be identical to those discussed in Section II.4.A.2) for the Proposed Action. However, the number of trains per day would be approximately 12% lower, thus reducing the frequency with which these impacts would occur.

Screening Level Health Risk Assessment

Since landfill gas generation rates would be the same under the Reduced Operations Alternative as under the Proposed Action, the results of the screening level health risk assessment described in Section II.4.A.2) would be applicable to the Reduced Operations Alternative as well.

3) Consistency with Regulatory Programs

Consistency with Federal Requirements

Comparison with Prevention of Significant Deterioration Significance Levels - The determination as to whether the Reduced Operations Alternative will be subject to Prevention of Significant Deterioration review is based on its emissions. As in the case of the Proposed Action, the "source" which could be subject to review includes the landfill gas flares and the mineral processing equipment. Except for a minor reduction in the emissions associated with on-site mineral processing equipment, the summary of emissions shown in Table 33 for the Proposed Action would be applicable to the Reduced Operations Alternative as well. The additional mitigation proposed for the flares under the Proposed Action would be applicable to the Reduced Operations Alternative as well, and would result in that Alternative's emissions being reduced to levels which would not require PSD review.

New Source Performance Standards for Non-Metallic Mineral Processing Plants (40CFR60.670) - As in the case of the Proposed Action, the cover processing operations under the Reduced Operations

Alternative would be subject to, and is expected to comply with, the applicable federal New Source Performance Standards.

Consistency with Local Requirements

Prohibitory Rules - The South Coast Air Quality Management District limits the emissions of various pollutants from many sources in the District, including landfill flares and other gas combustion devices. These rules will apply to the Reduced Operations Alternative, and this Alternative would comply with them. The applicable rules, discussed in Section II.4.A.3), are:

Rule 401 (Visible Emissions)
Rule 403 (Fugitive Dust)
Rule 404 (Particulate Matter - Concentration)
Rule 405 (Solid Particulate Matter - Weight)
Rule 409 (Combustion Contaminants)
Rule 431.1 (Sulfur Content of Gaseous Fuels)
Rule 53 (Specific Air Contaminants)
Rule 1150.1 (Control of Gaseous Emissions from Active Landfills)
Rule 1401 (Toxic Air Contaminants)

New Source Review Rules - The South Coast Air Quality Management District New Source Review rules (contained in Regulation II and Regulation XIII of the SCAQMD Rules and Regulations) govern the preconstruction review of new and modified stationary sources that emit nonattainment pollutants. The discussion of this rule with respect to the Proposed Action would apply to the Reduced Operations Alternative as well.

4) Mitigation

This discussion of mitigation measures includes regulatory actions by other agencies which are reasonably foreseeable, or which have future effective dates, as well as measures which can be implemented by the applicant. Regulatory measures which are already in effect are discussed in the Regulatory Setting portion of Section I.6, above. Estimates of project emissions reflect those measures required to comply with currently adopted regulations.

Truck Emissions

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

Locomotive Emissions

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

911

Landfill Equipment Emissions

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

Mitigation for On-Site Material Handling Impacts

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

Mitigation for Landfill Gas Generation and Combustion Impacts

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

Mitigation for Fugitive Dust Impacts

The same mitigation measures discussed in Section II.4.A.4) for the Proposed Action would be applicable to the Reduced Operations Alternative as well.

Mitigation Measures Recommended for Approval of the Reduced Operations Alternative

Based on the discussion in the preceding section, the same mitigation measures recommended for the Proposed Action are recommended as well for the Reduced Operations Alternative. These measures, which are discussed in more detail in Section II.4.A.4), are:

Mitigation Measure AQ-1:	Truck Emission Standards
Mitigation Measure AQ-2:	Diesel Fuel Quality
Mitigation Measure AQ-3:	South Coast Air Quality Management District Smoke Enforcement Program
Mitigation Measure AQ-4:	California Highway Patrol Diesel Truck Inspection Program
Mitigation Measure AQ-5:	State Low Emission Vehicle Regulations
Mitigation Measure AQ-6:	Locomotive Operating Procedures
Mitigation Measure AQ-7:	Diesel Fuel for Locomotive Operations
Mitigation Measure AQ-8:	Diesel Locomotive Emission Standards
Mitigation Measure AQ-9:	Diesel Locomotive Low Emission Retrofits
Mitigation Measure AQ-10:	Electrification of the Eagle Mountain Railway
Mitigation Measure AQ-11:	Landfill Equipment Operating Procedures
Mitigation Measure AQ-12:	Diesel Fuel for Landfill Equipment
Mitigation Measure AQ-13:	On-Highway Engines for Landfill Equipment
Mitigation Measure AQ-14:	Low NOx Engine Design for Landfill Equipment

Mitigation Measure AQ-15: Construction Equipment Emission Standards
Mitigation Measure AQ-16: Electrification of Landfill Equipment
Mitigation Measure AQ-17: Control of Flare Emissions
Mitigation Measure AQ-18: Temporary Road Surfaces
Mitigation Measure AQ-19: Transitional Road Surfaces
Mitigation Measure AQ-20: Permanent Road Surfaces
Mitigation Measure AQ-21: Tailing Excavation
Mitigation Measure AQ-22: Miscellaneous Fugitive Dust Sources
Mitigation Measure AQ-23: Weather Data Collection/Revised Air Quality Modeling Analysis

Summary of Remaining Project Impacts After Mitigation

Table 50 shows the effect of the recommended mitigation measures on total project emissions; Table 51 presents the same information for the sources which under within the direct control of Mine Reclamation Corp.

The data show that the recommended mitigation measures have the greatest benefits for reducing emissions of oxides of nitrogen and sulfur dioxide. The oxides of nitrogen reductions are due to the use of low NOx emitting engines in locomotives and on-site landfill equipment, as well as the electrification of portions of the operation. The NOx reductions associated with the use of a urea injection system on the flare at maximum flare gas production levels are not shown as a credit in these tables, since they have been incorporated into the project design and are reflected in all estimates of project emissions. This is because it is anticipated that this level of control may be required by regulation at the future date.

The sulfur dioxide reductions are due to the use of ultra-low sulfur fuel in all Diesel burning equipment owned by Mine Reclamation Corp. The use of this fuel results in associated reductions in particulate matter emissions as well. The use of an electric conveyor to transfer cover material for a portion of the distance which would otherwise be traveled by trucks on transitional roads results in a further reduction in particulate emissions.

In addition, the project design reflects substantial reductions (up to 95%) in particulate emissions due to a variety of dust suppression techniques, since it is likely that these measures would be required in order to comply with South Coast Air Quality Management District requirements. Consequently, all estimates of project emissions (with and without mitigation) reflect these reductions.

Relatively small reductions in carbon monoxide and volatile organic compounds (hydrocarbons) are expected beyond those already included in the project design to ensure that flare gas emissions of that pollutant do not exceed applicable regulatory trigger levels. The remaining sources of carbon monoxide and VOC's are Diesel engines, which have inherently low levels of these pollutants.

Table 50

Eagle Mountain Project - Reduced Operations Alternative
Effect of Mitigation on Project Emissions
(tons/year)

Activity	NOx	CO	PM10	VOC	SO2
			Without Mitigation		
Transfer Stations	208	67	23	20	27
Trains	1738	702	49	158	243
On-Highway Trucks	94	45	14	15	19
On-Site Vehicle Exhaust	429	144	32	26	44
On-Site Fugitive Dust*			115		
Landfill Gas Flares*	216	149	123	154	57
Project Total, Without Mitigation	2685	1107	356	373	390
			With Mitigation		
Transfer Stations	165	72	16	16	15
Trains	1554	702	45	158	173
On-Highway Trucks	94	45	14	15	19
On-Site Vehicle Exhaust	244	109	15	16	8
On-Site Fugitive Dust*			103		
Landfill Gas Flares*	216	149	123	154	57
Project Total, With Mitigation	2273	1077	316	359	272
REDUCTION DUE TO MITIGATION:					
Tons	412	30	40	14	118
Percent	(15%)	(3%)	(11%)	(4%)	(30%)

*Project design incorporated mitigation measures; see text for details.

Table 51

Eagle Mountain Project - Reduced Operations Alternative
Effect of Mitigation on Emissions
from Sources Owned by Mine Reclamation Corp.
(tons/year)

Activity		NOx	CO	PM10	VOC	SO2
			Without Mitigation			
Trains		441	177	19	69	78
On-Site Vehicle Exhaust		429	144	32	26	44
On-Site Fugitive Dust*				115		
Landfill Gas Flares*		216	149	123	154	57
Total, Without Mitigation		1086	470	289	249	179
			With Mitigation			
Trains		257	177	15	69	8
On-Site Vehicle Exhaust		244	109	15	16	8
On-Site Fugitive Dust*				103		
Landfill Gas Flares*		216	149	123	154	57
Total, With Mitigation		717	435	256	239	73
REDUCTION DUE TO MITIGATION						
	Tons	369	35	33	10	106
	Percent	(34%)	(7%)	(11%)	(4%)	(59%)

*Project design incorporated mitigation measures; see text for details.

Table 52 shows a re-analysis of the project's air quality impacts which reflect the mitigation measures. The data indicate that the state standard for nitrogen dioxide, and state and federal standards for fine particulates may still be exceeded. In addition, the analysis projects that Class I increments would still be exceeded for nitrogen dioxide, sulfur dioxide, and fine particulate matter.

As discussed earlier in this report, these analyses are conservative, and tend to substantially overestimate project impacts, particularly for longer averaging periods.

5) Assessment of Significance

Ozone - Table 53 compares the impacts from the Reduced Operations Alternative to various significance levels for ozone. In this table, hydrocarbon emissions are used to evaluate the significance of ozone impacts; there are no approved techniques available which can be used to estimate the change in ambient ozone concentrations due to any of the alternatives.

Compared with a baseline of zero emissions, the Reduced Operations Alternative would be expected to have a significant impact on ozone, due to significant increases in hydrocarbon emissions.

Within the South Coast Air Basin, the increases in emissions of hydrocarbons due to increased transport of waste are more than offset by the expected decrease in flare emissions. Consequently, the Reduced Operations Alternative is expected to have a beneficial impact on hydrocarbon emissions within the South Coast Air Basin, while resulting in a significant increase in the Desert Air Basin. Since both regions experience violations of the state and federal ozone standards, the overall impacts for ozone would be considered significant for the Reduced Operations Alternative.

Nitrogen Dioxide - Table 54 shows the impacts of the Reduced Operations Alternative on nitrogen dioxide. Once again, this Alternative is shown to result in significant impacts for this pollutant.

Carbon Monoxide - The impacts of the Reduced Operations Alternative on carbon monoxide is shown in Table 55. The data show that, compared with a baseline of zero emissions, this Alternative would have a significant impact on carbon monoxide. However, this alternative would reduce carbon monoxide emissions in the South Coast Air Basin - where state and federal air quality standards are exceeded - while increasing emissions in the Desert areas which still meet the standards. Since the air quality modeling analyses in show that the Reduced Operations Alternative would not result in a violation of any state or federal air quality standard for carbon monoxide, the overall impacts of this Alternative on carbon monoxide are expected to be insignificant, and beneficial within the South Coast Air Basin.

Table 52

Maximum Impact of Reduced Operations Alternative
on Ambient Air Quality
(with mitigation)
(all concentrations in micrograms per cubic meter)

Pollutant/ Averaging Time	California Standards	National Standards	Maximum Offsite Concen- tration	Maximum Background (1986-88)	Maximum Cumulative Impact	Maximum Impact at Class I Area	Allowable Class I Area Increment
CO							
1-hour	23,000	40,000	183.4	14,950	15,133	----	----
*8-hour	10,000	10,000	128.4	6,344	6,472	----	----
NO2							
1-hour	470	---	276.8	207	484	----	----
*Annual	---	100	25.4	32	57	7.6	2.5
SO2							
1-hour	655	---	63.7	210	274	----	----
*3-hour	---	1300	57.3	---	---	17.6	25
*24-hour	131	365	25.1	58	83	7.8	5
*Annual	---	80	6.3	5	11	1.9	2
PM10							
*24-hour	50	150	59.8	368	438	17.6	10.0
*Annual	30	50	14.9	65	80	4.4	5.0

*For project impacts:
3-hour = 0.9 x 1 hour
8-hour = 0.7 x 1 hour
24-hour = 0.4 x 1 hour
annual = 0.1 x 1 hour

Table 53

Assessment of Significance for Ozone
Eagle Mountain Project - Reduced Operations Alternative

Measure of Significance	Level	Reduced Operations Alternative Without Mitigation	Reduced Operations Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,045	1,969
AQMD major NSR	100 tons/year	373	359
AQMD major PSD	25 tons/year	373	359
AQMD sig incr PSD	25 tons/year	373	359
EPA major source	100 tons/year	373	359
EPA major mod	40 tons/year	373	359
Ozone Measurement Accuracy and Reporting Precision			
ARB accuracy	0.54 pphm		
ARB reporting	1 pphm		
Other Measures			
Zero molecule	0 lbs/day	2,045	1,969

Table 54

Assessment of Significance for Oxides of Nitrogen
Eagle Mountain Project - Reduced Operations Alternative

Measure of Significance	Level	Reduced Operations Alternative Without Mitigation	Reduced Operations Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	14,712	12,454
AQMD major NSR	100 tons/year	2,685	2,273
AQMD major PSD	25 tons/year	2,685	2,273
AQMD sig incr PSD	25 tons/year	2,685	2,273
EPA major source	100 tons/year	2,685	2,273
EPA major mod	40 tons/year	2,685	2,273
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	10 ug/m3 ann	27	25
EPA Class I ann	10 ug/m3 ann	27	25
EPA de minimus ann	14 ug/m3 ann	27	25
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.18 pphm 1-hr	16	15
ARB report 1h	1 pphm 1-hr	16	15
ARB report ann	0.1 pphm ann	1.4	1.4
Other Measures			
Zero molecule	0 lbs/day	14,712	12,454

92

Table 55

Assessment of Significance for Carbon Monoxide
Eagle Mountain Project - Reduced Operations Alternative

Measure of Significance	Level	Reduced Operations Alternative Without Mitigation	Reduced Operations Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	6,068	5,902
AQMD major NSR	100 tons/year	2,685	1,077
AQMD major PSD	25 tons/year	2,685	1,077
AQMD sig incr PSD	25 tons/year	2,685	1,077
EPA major source	100 tons/year	2,685	1,077
EPA major mod	40 tons/year	2,685	1,077
Concentration Based Measures - Industrial Sources			
EPA Class I 24 hr	1 ug/m3 24-hr	74	74
EPA de minimus 8h	575 ug/m3 8-hr	139	138
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.02 ppm 1-hr	0.16	0.16
ARB report 1h	1 ppm 1-hr	0.16	0.16
ARB report 8h	0.1 ppm 8-hr	0.12	0.12
Other Measures			
Zero molecule	0 lbs/day	6,068	5,902

Sulfur Dioxide - Table 56 shows the impacts of the Reduced Operations Alternative on sulfur dioxide. The data show that this Alternative would result in a significant impact for this pollutant.

Particulate Sulfates - Since particulate sulfates are formed in the atmosphere from emissions of sulfur dioxide, conclusions regarding the significance of sulfur dioxide impacts would be applicable to sulfates as well.

Fine Particulates - The impacts on fine particulates of the Reduced Operations Alternative is shown in Table 57. Once again, the data show that this Alternative is expected to result in significant impacts for this pollutant. However, the shift in landfill operations outside of the South Coast Air Basin results in a decrease in PM10 emissions which outweighs the increase due to transportation; consequently, the Reduced Operations Alternative would result in a net air quality benefit within the South Coast Air Basin. However, given the fact that both the Basin and Desert portions of Southern California exceed state and federal air quality standards for fine particulates, the overall impacts would still be considered significant.

Regional Visibility - Regional visibility is affected by emissions of hydrocarbons, oxides of nitrogen, sulfur dioxide, and particulate matter. Based on the analyses contained in preceding sections, the Reduced Operations Alternative would be expected to have a significant effect on regional visibility. Overall, this Alternative would be expected to result in a slight benefit in regional visibility in the South Coast Air Basin, and an adverse impact in the desert areas.

Acid Deposition - Acid deposition in California results from pollutants formed from oxides of nitrogen and sulfur oxides emissions. Based on the analyses contained in the preceding sections, the Reduced Operations Alternative would be expected to have a significant effect on acid deposition.

Toxic Air Pollutants - Each of the project alternatives is expected to have the same impact with respect to air toxics, which are associated with the combustion of flare gases. Although the analyses presented in this report assume that landfill gas generation rates would be the same for both in-basin and desert sites, the drier climate and lower moisture content in the waste would be expected to result in lower generation rates for the desert site alternatives. The lower gas generation rates would result in less flaring, which in turn would mean lower emissions of toxic air contaminants.

The screening level risk assessment shown in Section II.4.A.2) indicates that the risk from toxic air contaminants associated with the Proposed Action is greater than the 1 in a million level which is typically assumed to represent a significant impact.

Table 56

Assessment of Significance for Sulfur Dioxide
Eagle Mountain Project - Reduced Operations Alternative

Measure of Significance	Level	Reduced Operations Alternative Without Mitigation	Reduced Operations Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,138	1,490
AQMD major NSR	100 tons/year	390	272
AQMD major PSD	25 tons/year	390	272
AQMD sig incr PSD	25 tons/year	390	272
EPA major source	100 tons/year	390	272
EPA major mod	40 tons/year	390	272
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	2 ug/m3 ann	7	6
AQMD Class I 24h	5 ug/m3 24-hr	26	25
AQMD Class I 3h	25 ug/m3 3-hr	63	57
EPA Class I ann	2 ug/m3 ann	7	6
EPA Class I 24h	5 ug/m3 24-hr	26	25
EPA Class I 3h	25 ug/m3 3-hr	63	57
EPA de minimus 24h	13 ug/m3 24-hr	26	25
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.33 pphm 1-hr	2.7	2.4
ARB reporting 1h	1 pphm 1-hr	2.7	2.4
Other Measures			
Zero molecule	0 lbs/day	2,138	1,490

Table 57

Assessment of Significance for Fine Particulates
Eagle Mountain Project - Reduced Operations Alternative

Measure of Significance	Level	Reduced Operations Alternative Without Mitigation	Reduced Operations Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	1,950	1,727
AQMD major NSR	100 tons/year	356	316
AQMD major PSD	25 tons/year	356	316
AQMD sig incr PSD	25 tons/year	356	316
EPA major source	100 tons/year	356	316
EPA major mod	40 tons/year	356	316
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	5 ug/m3 ann	16	15
AQMD Class I 24h	10 ug/m3 24-hr	63	60
EPA Class I ann	5 ug/m3 ann	16	15
EPA Class I 24h	10 ug/m3 24-hr	63	60
EPA de minimus 24h	10 ug/m3 24-hr	63	60
Measurement Accuracy and Reporting Precision			
ARB accuracy 24h	1.2 ug/m3 24-hr	63	60
ARB reporting 24h	1 ug/m3 24-hr	63	60
ARB reporting ann	0.1 ug/m3 ann	16	15
Other Measures			
Zero molecule	0 lbs/day	1,950	1,727

Based on all of these factors, a significant impact is expected from toxic air contaminants for the Reduced Operations Alternative as well, and further health risk assessments and mitigation measures should be required.

Global Warming - "Greenhouse" gases which could contribute to the global warming effect are generated by the operation of landfill equipment; the flaring of landfill gases; and the transportation of waste material.

The operation of landfill equipment would result in approximately 14% fewer emissions of "greenhouse" gases, as compared with the Proposed Action. Overall, the Reduced Operations Alternative would result in the generation of gases which could contribute to global warming. However, the state of knowledge regarding global warming is not adequate to allow an assessment of the significance of the impacts of any individual project at the present time.

Overall Assessment of Significance

Based on the analyses contained in the preceding sections, the Reduced Operations Alternative is expected to have a significant effect on air quality. However, the Reduced Operations Alternative could result in air quality benefits in the South Coast Air Basin for ozone, carbon monoxide, and particulate matter, at the expense of increased impacts in desert areas. The improvements in South Coast Air Basin would pass through to the desert areas over the San Gorgonio Pass; however, these benefits would not be sufficient to outweigh the direct adverse impacts in the desert.

C. Rail Access Only Alternative

1) Emissions Impacts

Emissions from the Rail Access Only Alternative will be associated with the same activities as the Proposed Action, although to a less extent and excluding truck delivery activities. These activities will occur both offsite, such as the operation of urban transfer stations, and on-site, including all of the operations at the Eagle Mountain site. They will involve both stationary sources, such as the landfill gas flares, and mobile equipment, such as the trains hauling waste. By emission type, project sources can be grouped into four classes: motor vehicles, fugitive dust sources, fugitive vapor sources, and stationary combustion sources. Motor vehicles include train locomotives and off-highway highway equipment. Fugitive dust sources include short-term construction activities, landfill road use, mine tailing reclamation, and solid waste covering. Fugitive vapor sources include the landfill, and stationary combustion sources include the landfill gas flares.

Motor vehicles will generate "tailpipe" emissions and, in the case of on-site vehicles, fugitive dust from unpaved roads and cover material handling. Processing of daily cover material will produce particulate emissions as ore tailing are reclaimed by screening and crushing. As the refuse begins to decompose, gas will be generated by the anaerobic activity in the landfill. The gas will consist primarily of methane and carbon dioxide with trace concentrations of other substances either produced by the bacterial activity or evaporated from materials disposed of in the landfill. The gas will be collected through a series of underground pipes and will be disposed of by flaring. The burning of the landfill gas in flares will result in the production of combustion emissions. Each of these sources is discussed in more detail below.

<u>Construction Operations</u> - The emissions associated with construction of the Rail Access Only Alternative will be the same as those described in Section II.4.A.1) for the Proposed Action.

<u>Transfer Stations</u> - The basic transfer station operations under the Rail Access Only Alternative would be the same as those described in Section II.4.A.1) for the Proposed Action, with the exception of the Riverside/San Bernardino truck station. Equipment activity rates, emission factors, and daily emissions for a typical transfer station are shown previously in Table 19 for the Proposed Action. Under this Alternative, only six transfer stations will be needed. Total emissions from these six stations are shown in Table 58.

<u>Solid Waste Transport</u> - Under the Reduced Operations Alternative, solid waste will be transported to Eagle Mountain only by trains. Waste will arrive at Eagle Mountain in 25 ton containers compacted at urban transfer sites. Rail transportation will produce exhaust emissions from the combustion of diesel fuel in internal combustion engines. The configurations of trains will be the same as under the Proposed Action.

Fuel use and emissions for train operations under the Rail Access Only Alternative would be the same as for the Proposed Action, as shown in Table 21 above.

<u>On-Site Material Handling (except Fugitive Dust)</u> - As a category, on-site construction equipment is the largest source of gaseous emissions on the project site. Cumulatively, on-site construction equipment consumes nearly 6,600 gallons of diesel fuel per day. Nearly 28% of this fuel is consumed by the fleet of trucks which will haul containers from the rail line to the landfill face, while the remainder is distributed among five other general categories of operations. The emission rates of equipment grouped within these categories are the same as those shown in Table 46 above for the Reduced Operations Alternative.

At the peak of landfill activity, container haul trucks will be in almost constant motion. The disposal of 16,000 tons of solid waste in 25 ton containers will require 640 trips by the truck fleet each day between the container handling yard and the active face of the landfill. Operating during 10 hours of daylight each day, the 26

CAK

Table 58

Eagle Mountain Project
Transfer Station Emissions (Total)
Rail Access Only Alternative Without Mitigation

Vehicle Type	Number	Hr/Day	Fuel Gal/Hr
Rubber-tired Loader	18	20	6
Container Handler	12	20	6
Train Car Spotter	2	5	7

	Emission Factors (lb/1000 gal)*				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	325.18	81.00	31.70	23.48	33.54
Container Handler	325.18	81.00	31.70	23.48	33.54
Train Car Spotter	466.05	287.22	49.70	68.87	33.30

Vehicle Type	Number	Mileage Per Day
Transfer Truck/Trailer	24	450

	Emission Factors (gm/VMT)**				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Transfer Truck/Trailer	15.65	7.40	2.28	2.44	3.21

	Emissions (lb/day)				
Vehicle Type	NOx	CO	PM10	VOC	SO2
Rubber-tired Loader	702.39	174.96	68.46	50.71	72.44
Transfer Truck/Trailer	372.72	176.11	54.20	58.17	76.45
Container Handler	468.26	116.64	45.64	33.81	48.29
Train Car Spotter	32.62	20.11	3.48	4.82	2.33
Total	1575.99	487.82	171.78	147.52	199.51

References:

*"Feasibility and Cost Effectiveness of Controlling Emissions from Diesel Engines in Rail, Marine, Construction, Farm and Other Mobile Off-Highway Equipment", Radian Corporation (2/88), Table 7-1 converted to lbs/1000 gal. based on 0.4 lbs fuel/BHP and 7.1 lbs/gal. fuel.

**California Air Resources Board's EMFAC7D/BURDEN7B models for 1995 calendar year, Southeast Desert Air Basin

trucks will each complete a circuit of loading and dumping every 24 minutes.

In the container handling yard, overhead cranes and container handlers will also operate continuously during peak periods. Cranes will transfer loaded waste containers from rail cars to container haul trucks and empty containers from returning haul trucks back to rail cars. All of this transfer equipment will be powered by diesel engines and generate exhaust emissions during operation.

Other combustion emissions sources under the Rail Access Only Alternative would be the same as those described in Section II.4.B.1) for the Reduced Operations Alternative.

Landfill Gas Generation and Combustion - Estimates of landfill gas generation, and associated emissions impacts, are the same for the Rail Access Only Alternative as for the Proposed Project. These estimates are discussed in Section II.4.A.1).

Fugitive Dust - Fugitive dust emissions from the Rail Access Only Alternative involve the same types of activities as discussed in Section II.4.B.1) for the Reduced Operations Alternative.

Overall Project Impacts - Emissions - Total emissions from all sources under the Rail Access Only Alternative at maximum projected operating levels are shown in Table 59. These emission levels include controls that the project must incorporate in order to comply with South Coast Air Quality Management District and U.S. Environmental Protection Agency emission standards. The emissions are reported in terms of pounds per day and tons per year.

2) Project Impacts - Ambient Concentrations

Ambient concentrations associated with the Rail Access Only Alternative would be the same as those discussed in Section II.4.B.2) for the Reduced Operations Alternative.

3) Consistency with Regulatory Programs

The Rail Access Only Alternative would demonstrate consistency with applicable federal and local air quality requirements in the same manner as the Reduced Operations Alternative, discussed in Section II.4.B.3).

4) Mitigation

The same mitigation measures discussed above for the Reduced Operations Alternative would be applicable to the Rail Access Only Alternative, with the exception of those measures directed towards on-highway trucks. The same mitigation measures recommended for the Proposed Action are recommended as well for the Rail Access Only Alternative, with the exception of truck mitigation measures. These

Table 59

Eagle Mountain Project
Total Project Emissions
Rail Access Only Alternative Without Mitigation

	(lb/day)					(ton/yr)				
Activity	NOx	CO	PM10	VOC	SO2	NOx	CO	PM10	VOC	SO2
Offsite Sources:										
Transfer Stations	1576	488	172	148	200	288	89	31	27	37
Trains	10881	4399	306	990	1520	1986	803	56	181	277
On-Highway Trucks	0	0	0	0	0	0	0	0	0	0
Subtotal, Offsite	12457	4887	478	1138	1720	2274	892	87	208	314
Onsite Sources:										
Onsite Vehicle Exhaust	2352	789	175	140	242	429	144	32	26	44
Onsite Fugitive Dust			630					115		
Landfill Gas Flares	1182	816	676	845	310	216	149	123	154	57
Subtotal, Onsite	3534	1605	1481	985	552	645	293	270	180	101
PROJECT GRAND TOTAL	15991	6492	1959	2123	2272	2919	1185	357	388	415

measures, which are discussed in more detail in Section II.4.A.4), are:

Mitigation Measure AQ-6:	Locomotive Operating Procedures
Mitigation Measure AQ-7:	Diesel Fuel for Locomotive Operations
Mitigation Measure AQ-8:	Diesel Locomotive Emission Standards
Mitigation Measure AQ-9:	Diesel Locomotive Low Emission Retrofits
Mitigation Measure AQ-10:	Electrification of the Eagle Mountain Railway
Mitigation Measure AQ-11:	Landfill Equipment Operating Procedures
Mitigation Measure AQ-12:	Diesel Fuel for Landfill Equipment
Mitigation Measure AQ-13:	On-Highway Engines for Landfill Equipment
Mitigation Measure AQ-14:	Low NOx Engine Design for Landfill Equipment
Mitigation Measure AQ-15:	Construction Equipment Emission Standards
Mitigation Measure AQ-16:	Electrification of Landfill Equipment
Mitigation Measure AQ-17:	Control of Flare Emissions
Mitigation Measure AQ-18:	Temporary Road Surfaces
Mitigation Measure AQ-19:	Transitional Road Surfaces
Mitigation Measure AQ-20:	Permanent Road Surfaces
Mitigation Measure AQ-21:	Tailing Excavation
Mitigation Measure AQ-22:	Miscellaneous Fugitive Dust Sources
Mitigation Measure AQ-23:	Weather Data Collection/Revised Air Quality Modeling Analysis

Summary of Remaining Project Impacts After Mitigation

Table 60 shows the effect of the recommended mitigation measures on total project emissions; Table 61 presents the same information for the sources which under within the direct control of Mine Reclamation Corp. The data show that the recommended mitigation measures have the greatest benefits for reducing emissions of oxides of nitrogen and sulfur dioxide. The oxides of nitrogen reductions are due to the use of low NOx emitting engines in locomotives and on-site landfill equipment, as well as the electrification of portions of the operation. The NOx reductions associated with the use of a urea injection system on the flare at maximum flare gas production levels are not shown as a credit in these tables, since they have been incorporated into the project design and are reflected in all estimates of project emissions. This is because it is anticipated that this level of control may be required by regulation at the future date.

Table 60

Eagle Mountain Project - Rail Access Only Alternative
Effect of Mitigation on Project Emissions
(tons/year)

Activity	NOx	CO	PM10	VOC	SO2
		Without Mitigation			
Transfer Stations	288	89	31	27	37
Trains	1986	803	56	181	277
On-Highway Trucks	0	0	0	0	0
On-Site Vehicle Exhaust	429	144	32	26	44
On-Site Fugitive Dust*			115		
Landfill Gas Flares*	216	149	123	154	57
Project Total, Without Mitigation	2919	1185	357	388	415
		With Mitigation			
Transfer Stations	225	98	20	21	19
Trains	1775	803	51	181	197
On-Highway Trucks	0	0	0	0	0
On-Site Vehicle Exhaust	244	109	15	16	8
On-Site Fugitive Dust*			103		
Landfill Gas Flares*	216	149	123	154	57
Project Total, With Mitigation	2460	1159	312	372	281
REDUCTION DUE TO MITIGATION:					
Tons	459	26	45	16	134
Percent	(16%)	(2%)	(13%)	(4%)	(32%)

*Project design incorporated mitigation measures; see text for details.

Table 61

Eagle Mountain Project - Rail Access Only Alternative
Effect of Mitigation on Emissions
from Sources Owned by Mine Reclamation Corp.
(tons/year)

Activity	NOx	CO	PM10	VOC	SO2
		Without Mitigation			
Trains	504	203	21	79	89
On-Site Vehicle Exhaust	429	144	32	26	44
On-Site Fugitive Dust*			115		
Landfill Gas Flares*	216	149	123	154	57
Total, Without Mitigation	1149	496	291	259	190
		With Mitigation			
Trains	294	203	17	79	9
On-Site Vehicle Exhaust	244	109	15	16	8
On-Site Fugitive Dust*			103		
Landfill Gas Flares*	216	149	123	154	57
Total, With Mitigation	754	461	258	249	74
REDUCTION DUE TO MITIGATION					
Tons	395	35	33	10	116
Percent	(34%)	(7%)	(11%)	(4%)	(61%)

*Project design incorporated mitigation measures; see text for details.

The sulfur dioxide reductions are due to the use of ultra-low sulfur fuel in all Diesel burning equipment owned by Mine Reclamation Corp. The use of this fuel results in associated reductions in particulate matter emissions as well. The use of an electric conveyor to transfer cover material for a portion of the distance which would otherwise be traveled by trucks on transitional roads results in a further reduction in particulate emissions.

In addition, the project design reflects substantial reductions (up to 95%) in particulate emissions due to a variety of dust suppression techniques, since it is likely that these measures would be required in order to comply with South Coast Air Quality Management District requirements. Consequently, all estimates of project emissions (with and without mitigation) reflect these reductions.

Relatively small reductions in carbon monoxide and volatile organic compounds (hydrocarbons) are expected beyond those already included in the project design to ensure that flare gas emissions of that pollutant do not exceed applicable regulatory trigger levels. The remaining sources of carbon monoxide and VOC's are Diesel engines, which have inherently low levels of these pollutants.

5) Assessment of Significance

Ozone - Table 62 compares the impacts from the Rail Access Only Alternative to various significance levels for ozone. In this table, hydrocarbon emissions are used to evaluate the significance of ozone impacts; there are no approved techniques available which can be used to estimate the change in ambient ozone concentrations due to any of the alternatives.

Compared with a baseline of zero emissions, the Rail Access Only Alternative would be expected to have a significant impact on ozone, due to significant increases in hydrocarbon emissions.

Within the South Coast Air Basin, the increases in emissions of hydrocarbons due to increased transport of waste are more than offset by the expected decrease in flare emissions. Consequently, the Rail Access Only Alternative is expected to have a beneficial impact on hydrocarbon emissions within the South Coast Air Basin, while resulting in a significant increase in the Desert Air Basin. Since both regions experience violations of the state and federal ozone standards, the overall impacts for ozone would be considered significant for the Rail Access Only Alternative.

Nitrogen Dioxide - Table 63 shows the impacts of the Rail Access Only Alternative on nitrogen dioxide. Once again, this Alternative is shown to result in significant impacts for this pollutant.

Table 62

Assessment of Significance for Ozone
Eagle Mountain Project - Rail Access Only Alternative

Measure of Significance	Level	Rail Access Only Alternative Without Mitigation	Rail Access Only Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,232	2,037
AQMD major NSR	100 tons/year	388	372
AQMD major PSD	25 tons/year	388	372
AQMD sig incr PSD	25 tons/year	388	372
EPA major source	100 tons/year	388	372
EPA major mod	40 tons/year	388	372
Ozone Measurement Accuracy and Reporting Precision			
ARB accuracy	0.54 pphm		
ARB reporting	1 pphm		
Other Measures			
Zero molecule	0 lbs/day	2,123	2,037

Table 63

Assessment of Significance for Oxides of Nitrogen
Eagle Mountain Project - Rail Access Only Alternative

Measure of Significance	Level	Rail Access Only Alternative Without Mitigation	Rail Access Only Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	15,991	13,480
AQMD major NSR	100 tons/year	2,919	2,460
AQMD major PSD	25 tons/year	2,919	2,460
AQMD sig incr PSD	25 tons/year	2,919	2,460
EPA major source	100 tons/year	2,919	2,460
EPA major mod	40 tons/year	2,919	2,460
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	10 ug/m3 ann	27	25
EPA Class I ann	10 ug/m3 ann	27	25
EPA de minimus ann	14 ug/m3 ann	27	25
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.18 pphm 1-hr	16	15
ARB report 1h	1 pphm 1-hr	16	15
ARB report ann	0.1 pphm ann	1.4	1.4
Other Measures			
Zero molecule	0 lbs/day	15,991	13,480

Carbon Monoxide - The impacts of the Rail Access Only Alternative on carbon monoxide is shown in Table 64. The data show that, compared with a baseline of zero emissions, this Alternative would have a significant impact on carbon monoxide. However, this alternative would reduce carbon monoxide emissions in the South Coast Air Basin - where state and federal air quality standards are exceeded - while increasing emissions in the Desert areas which still meet the standards. Since the air quality modeling analyses in show that the Rail Access Only Alternative would not result in a violation of any state or federal air quality standard for carbon monoxide, the overall impacts of this Alternative on carbon monoxide are expected to be insignificant, and beneficial within the South Coast Air Basin.

Sulfur Dioxide - Table 65 shows the impacts of the Rail Access Only Alternative on sulfur dioxide. The data show that this Alternative would result in a significant impact for this pollutant.

Particulate Sulfates - Since particulate sulfates are formed in the atmosphere from emissions of sulfur dioxide, conclusions regarding the significance of sulfur dioxide impacts would be applicable to sulfates as well.

Fine Particulates - The impacts on fine particulates of the Rail Access Only Alternative is shown in Table 66. Once again, the data show that this Alternative is expected to result in significant impacts for this pollutant. However, the shift in landfill operations outside of the South Coast Air Basin results in a decrease in PM10 emissions which outweighs the increase due to transportation; consequently, the Rail Access Only Alternative would result in a net air quality benefit within the South Coast Air Basin. However, given the fact that both the Basin and Desert portions of Southern California exceed state and federal air quality standards for fine particulates, the overall impacts would still be considered significant.

Regional Visibility - Regional visibility is affected by emissions of hydrocarbons, oxides of nitrogen, sulfur dioxide, and particulate matter. Based on the analyses contained in preceding sections, the Rail Access Only Alternative would be expected to have a significant effect on regional visibility. Overall, this Alternative would be expected to result in a slight benefit in regional visibility in the South Coast Air Basin, and an adverse impact in the desert areas.

Acid Deposition - Acid deposition in California results from pollutants formed from oxides of nitrogen and sulfur oxides emissions. Based on the analyses contained in the preceding sections, the Rail Access Only Alternative would be expected to have a significant effect on acid deposition.

Table 64

Assessment of Significance for Carbon Monoxide
Eagle Mountain Project - Rail Access Only Alternative

Measure of Significance	Level	Rail Access Only Alternative Without Mitigation	Rail Access Only Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	6,492	6,346
AQMD major NSR	100 tons/year	1,185	1,159
AQMD major PSD	-25 tons/year	1,185	1,159
AQMD sig incr PSD	25 tons/year	1,185	1,159
EPA major source	100 tons/year	1,185	1,159
EPA major mod	40 tons/year	1,185	1,159
Concentration Based Measures - Industrial Sources			
EPA Class I 24 hr	1 ug/m3 24-hr	74	74
EPA de minimus 8h	575 ug/m3 8-hr	139	138
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.02 ppm 1-hr	0.16	0.16
ARB report 1h	1 ppm 1-hr	0.16	0.16
ARB report 8h	0.1 ppm 8-hr	0.12	0.12
Other Measures			
Zero molecule	0 lbs/day	6,492	6,346

Table 65

Assessment of Significance for Sulfur Dioxide
Eagle Mountain Project - Rail Access Only Alternative

Measure of Significance	Level	Rail Access Only Alternative Without Mitigation	Rail Access Only Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	2,272	1,538
AQMD major NSR	100 tons/year	415	281
AQMD major PSD	25 tons/year	415	281
AQMD sig incr PSD	25 tons/year	415	281
EPA major source	100 tons/year	415	281
EPA major mod	40 tons/year	415	281
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	2 ug/m3 ann	7	6
AQMD Class I 24h	5 ug/m3 24-hr	26	25
AQMD Class I 3h	25 ug/m3 3-hr	63	57
EPA Class I ann	2 ug/m3 ann	7	6
EPA Class I 24h	5 ug/m3 24-hr	26	25
EPA Class I 3h	25 ug/m3 3-hr	63	57
EPA de minimus 24h	13 ug/m3 24-hr	26	25
Measurement Accuracy and Reporting Precision			
ARB accuracy 1h	0.33 pphm 1-hr	2.7	2.4
ARB reporting 1h	1 pphm 1-hr	2.7	2.4
Other Measures			
Zero molecule	0 lbs/day	2,272	1,538

101

Table 66

Assessment of Significance for Fine Particulates
Eagle Mountain Project - Rail Access Only Alternative

Measure of Significance	Level	Rail Access Only Alternative Without Mitigation	Rail Access Only Alternative With Mitigation
		Zero Baseline	Zero Baseline
Emissions Based Measures - Industrial			
AQMD BACT/OFFSETS	0 lbs/day	1,959	1,713
AQMD major NSR	100 tons/year	357	312
AQMD major PSD	25 tons/year	357	312
AQMD sig incr PSD	25 tons/year	357	312
EPA major source	100 tons/year	357	312
EPA major mod	40 tons/year	357	312
Concentration Based Measures - Industrial Sources			
AQMD Class I ann	5 ug/m3 ann	16	15
AQMD Class I 24h	10 ug/m3 24-hr	63	60
EPA Class I ann	5 ug/m3 ann	16	15
EPA Class I 24h	10 ug/m3 24-hr	63	60
EPA de minimus 24h	10 ug/m3 24-hr	63	60
Measurement Accuracy and Reporting Precision			
ARB accuracy 24h	1.2 ug/m3 24-hr	63	60
ARB reporting 24h	1 ug/m3 24-hr	63	60
ARB reporting ann	0.1 ug/m3 ann	16	15
Other Measures			
Zero molecule	0 lbs/day	1,959	1,713

Toxic Air Pollutants - Each of the project alternatives is expected to have the same impact with respect to air toxics, which are associated with the combustion of flare gases. Although the analyses presented in this report assume that landfill gas generation rates would be the same for both in-basin and desert sites, the drier climate and lower moisture content in the waste would be expected to result in lower generation rates for the desert site alternatives. The lower gas generation rates would result in less flaring, which in turn would mean lower emissions of toxic air contaminants.

The screening level risk assessment shown in Section II.4.A.2) indicates that the risk from toxic air contaminants associated with the Proposed Action is greater than the 1 in a million level which is typically assumed to represent a significant impact.

Based on all of these factors, a significant impact is expected from toxic air contaminants for the Rail Access Only Alternative as well, and further health risk assessments and mitigation measures should be required.

Global Warming - "Greenhouse" gases which could contribute to the global warming effect are generated by the operation of landfill equipment; the flaring of landfill gases; and the transportation of waste material.

The operation of landfill equipment would result in approximately 14% fewer emissions of "greenhouse" gases, as compared with the Proposed Action. Overall, the Rail Access Only Alternative would result in the generation of gases which could contribute to global warming. However, the state of knowledge regarding global warming is not adequate to allow an assessment of the significance of the impacts of any individual project at the present time.

Overall Assessment of Significance

Based on the analyses contained in the preceding sections, the Rail Access Only Alternative is expected to have a significant effect on air quality. However, the Rail Access Only Alternative could result in air quality benefits in the South Coast Air Basin for ozone, carbon monoxide, and particulate matter, at the expense of increased impacts in desert areas. The improvements in South Coast Air Basin would pass through to the desert areas over the San Gorgonio Pass; however, these benefits would not be sufficient to outweigh the direct adverse impacts in the desert.

D. No Project Alternative

The No Project Alternative assumes that Southern California's landfill needs will continue to be met through use of existing and additional capacity within the South Coast Air Basin. Under this alternative, truck traffic associated with residential and commercial waste pickups would be identical to that associated with the Eagle Mountain project. (These impacts were assumed to be identical for all cases, and thus were not quantified.) In addition, it was assumed that there would be a slight increase in truck travel distances to transfer stations and/or landfills. This increase in truck traffic was based on the following estimates of replacement and expanded landfill capacity:

Origin of Waste Material	Estimated Quantity (tons/day)	Additional Round Trip Distance
Orange County	2,000	0 miles
Riverside County	2,000	0 miles
San Bernardino County	2,000	60 miles
San Gabriel Valley	7,000	0 miles
Central LA/SF Valley	5,000	20 miles
Weighted Average	18,000	12.2 miles

1) Emissions Impacts

For this case, no use of rail was assumed. With respect to waste handling equipment at the landfill, project emissions were assumed to be associated with landfill face operations; cover excavation, hauling, and daily application; and road maintenance. Landfill gas generation was conservatively assumed to be the same as the amount estimated for the Eagle Mountain project, although the higher moisture levels and rainfall in the South Coast Air Basin would be expected to result in more landfill gas generated for each ton of waste buried. Compliance with applicable dust control regulations and best available control technology was assumed for this alternative; however, the use of advanced controls to reduce flare emissions was not assumed, as existing flares (or other gas disposal equipment) would be used under the No Project Alternative.

The emissions associated with this alternative are summarized in Table 67.

2) Project Impacts - Ambient Concentrations

Due to the large number of existing landfill sites, it is not reasonably possible to estimate the ambient pollutant concentrations at these sites. Ambient concentrations may be either higher or lower depending on local geography and weather patterns.

3) Consistency with Regulatory Programs

It is assumed that existing landfill operations are in compliance with all applicable air quality rules and regulations. It is not clear whether the expansions required to continue accommodating the 20,000 tons/day of waste which would otherwise go to the Eagle Mountain landfill would require additional air quality permits.

Table 67

No Project Alternative
Total Project Emissions

Activity	(lb/day) NOx	CO	PM10	VOC	SO2	(ton/yr) NOx	CO	PM10	VOC	SO2
Transfer Stations	1780	539	192	162	221	325	98	35	30	40
Trains	0	0	0	0	0	0	0	0	0	0
On-Highway Trucks	337	159	49	53	69	61	29	9	10	13
Onsite Vehicle Exhaust	1722	615	134	111	175	314	112	24	20	32
Onsite Fugitive Dust			721					132		
Landfill Gas Flares	1689	8164	676	1689	310	308	1490	123	308	57
PROJECT GRAND TOTAL	5528	9477	1772	2015	775	1008	1729	323	368	142

104

5) Assessment of Significance

Ozone - Table 68 compares the impacts from the No Project Alternative to various significance levels for ozone. In this table, hydrocarbon emissions are used to evaluate the significance of ozone impacts; there are no approved techniques available which can be used to estimate the change in ambient ozone concentrations due to any of the alternatives.

Compared with a baseline of zero emissions, the No Project Alternative would be expected to have a significant impact on ozone, due to significant levels of hydrocarbon emissions.

Nitrogen Dioxide - Table 69 shows the impacts of the No Project Alternative on nitrogen dioxide. Once again, this Alternative is shown to result in significant impacts for this pollutant.

Carbon Monoxide - The impacts of the No Project Alternative on carbon monoxide is shown in Table 70. The data show that, compared with a baseline of zero emissions, this Alternative would have a significant impact on carbon monoxide.

Sulfur Dioxide - Table 71 shows the impacts of the No Project Alternative on sulfur dioxide. The data show that this Alternative would result in a significant impact for this pollutant.

Particulate Sulfates - Since particulate sulfates are formed in the atmosphere from emissions of sulfur dioxide, conclusions regarding the significance of sulfur dioxide impacts would be applicable to sulfates as well.

Fine Particulates - The impacts on fine particulates of the No Project Alternative is shown in Table 72. Once again, the data show that this Alternative is expected to result in significant impacts for this pollutant.

Regional Visibility - Regional visibility is affected by emissions of hydrocarbons, oxides of nitrogen, sulfur dioxide, and particulate matter. Based on the analyses contained in preceding sections, the No Project Alternative would be expected to have a significant effect on regional visibility.

Acid Deposition - Acid deposition in California results from pollutants formed from oxides of nitrogen and sulfur oxides emissions. Based on the analyses contained in the preceding sections, the No Project Alternative would be expected to have a significant effect on acid deposition.

Table 68

Assessment of Significance for Ozone
Eagle Mountain Project - No Project Alternative

Measure of Significance	Level	Project Without Mitigation
		Zero Baseline
Emissions Based Measures - Industrial		
AQMD BACT/OFFSETS	0 lbs/day	2,015
AQMD major NSR	100 tons/year	368
AQMD major PSD	25 tons/year	368
AQMD sig incr PSD	25 tons/year	368
EPA major source	100 tons/year	368
EPA major mod	40 tons/year	368
Ozone Measurement Accuracy and Reporting Precision		
ARB accuracy	0.54 pphm	
ARB reporting	1 pphm	
Other Measures		
Zero molecule	0 lbs/day	2,015

Table 69

Assessment of Significance for Oxides Nitrogen
Eagle Mountain Project - No Project Alternative

Measure of Significance	Level	Project Without Mitigation: Zero Baseline
Emissions Based Measures - Industrial		
AQMD BACT/OFFSETS	0 lbs/day	5,528
AQMD major NSR	100 tons/year	1,008
AQMD major PSD	25 tons/year	1,008
AQMD sig incr PSD	25 tons/year	1,008
EPA major source	100 tons/year	1,008
EPA major mod	40 tons/year	1,008
Concentration Based Measures - Industrial Sources		
AQMD Class I ann	10 ug/m3 ann	27
EPA Class I ann	10 ug/m3 ann	27
EPA de minimum ann	14 ug/m3 ann	27
Measurement Accuracy and Reporting Precision		
ARB accuracy 1h	0.18 pphm 1-hr	18
ARB report 1h	1 pphm 1-hr	18
ARB report ann	0.1 pphm ann	1.4
Other Measures		
Zero molecule	0 lbs/day	5,528

Table 70

Assessment of Significance for Carbon Monoxide
Eagle Mountain Project - No Project Alternative

Measure of Significance	Level	Project Without Mitigation: Zero Baseline
Emissions Based Measures - Industrial		
AQMD BACT/OFFSETS	0 lbs/day	9,477
AQMD major NSR	100 tons/year	1,729
AQMD major PSD	25 tons/year	1,729
AQMD sig incr PSD	25 tons/year	1,729
EPA major source	100 tons/year	1,729
EPA major mod	40 tons/year	1,729
Concentration Based Measures - Industrial Sources		
EPA Class I 24 hr	1 ug/m3 24-hr	75
EPA de minimus 8h	575 ug/m3 8-hr	132
Measurement Accuracy and Reporting Precision		
ARB accuracy 1h	0.02 ppm 1-hr	0.16
ARB report 1h	1 ppm 1-hr	0.16
ARB report 8h	0.1 ppm 8-hr	0.12
Other Measures		
Zero molecule	0 lbs/day	9,477

1060

Table 71

Assessment of Significance for Sulfur Dioxide
Eagle Mountain Project - No Project Alternative

Measure of Significance	Level	Project Without Mitigation
		Zero Baseline
Emissions Based Measures - Industrial		
AQMD BACT/OFFSETS	0 lbs/day	775
AQMD major NSR	100 tons/year	142
AQMD major PSD	25 tons/year	142
AQMD sig incr PSD	25 tons/year	142
EPA major source	100 tons/year	142
EPA major mod	40 tons/year	142
Concentration Based Measures - Industrial Sources		
AQMD Class I ann	2 ug/m3 ann	7
AQMD Class I 24h	5 ug/m3 24-hr	26
AQMD Class I 3h	25 ug/m3 3-hr	64
EPA Class I ann	2 ug/m3 ann	7
EPA Class I 24h	5 ug/m3 24-hr	26
EPA Class I 3h	25 ug/m3 3-hr	64
EPA de minimus 24h	13 ug/m3 24-hr	26
Measurement Accuracy and Reporting Precision		
ARB accuracy 1h	0.33 pphm 1-hr	2.7
ARB reporting 1h	1 pphm 1-hr	2.7
Other Measures		
Zero molecule	0 lbs/day	775

Table 72

Assessment of Significance for Fine Particulate
Eagle Mountain Project - No Project Alternative

Measure of Significance	Level	Project Without Mitigation
		Zero Baseline
Emissions Based Measures - Industrial		
AQMD BACT/OFFSETS	0 lbs/day	1,772
AQMD major NSR	100 tons/year	323
AQMD major PSD	25 tons/year	323
AQMD sig incr PSD	25 tons/year	323
EPA major source	100 tons/year	323
EPA major mod	40 tons/year	323
Concentration Based Measures - Industrial Sources		
AQMD Class I ann	5 ug/m3 ann	19
AQMD Class I 24h	10 ug/m3 24-hr	77
EPA Class I ann	5 ug/m3 ann	19
EPA Class I 24h	10 ug/m3 24-hr	77
EPA de minimus 24h	10 ug/m3 24-hr	77
Measurement Accuracy and Reporting Precision		
ARB accuracy 24h	1.2 ug/m3 24-hr	77
ARB reporting 24h	1 ug/m3 24-hr	77
ARB reporting ann	0.1 ug/m3 ann	19
Other Measures		
Zero molecule	0 lbs/day	1,772

107

Toxic Air Pollutants - Each of the project alternatives is expected to have the same impact with respect to air toxics, which are associated with the combustion of flare gases. Although the analyses presented in this report assume that landfill gas generation rates would be the same for both in-basin and desert sites, the more moist climate and higher moisture content in the waste would be expected to result in higher generation rates for the No Project Alternative. The higher gas generation rates would result in more flaring, which in turn would mean higher emissions of toxic air contaminants.

Global Warming - "Greenhouse" gases which could contribute to the global warming effect are generated by the operation of landfill equipment; the flaring of landfill gases; and the transportation of waste material. Overall, the No Project Alternative would result in the generation of gases which could contribute to global warming in an amount less than that generated under the Proposed Action.

Overall Assessment of Significance

Based on the analyses contained in the preceding sections, the No Project Alternative is expected to have a significant effect on air quality.

5. COMPARISON OF ALTERNATIVES

A comparison of the emissions associated with each of the four project alternatives is shown in Figures 35-39 for each of the criteria pollutants.

With respect to oxides of nitrogen, the data in Figure 35 show that each of the alternatives would result in a substantial increase in oxides of nitrogen emissions compared to the No Project Alternative, due principally to the emissions associated with long distance transportation of 16 - 20 thousand tons of waste per day. While the mitigation measures would reduce these impacts somewhat, the remaining impacts would still be significant. As discussed previously, the NOx emissions from the No Project Alternative would be considered significant as well.

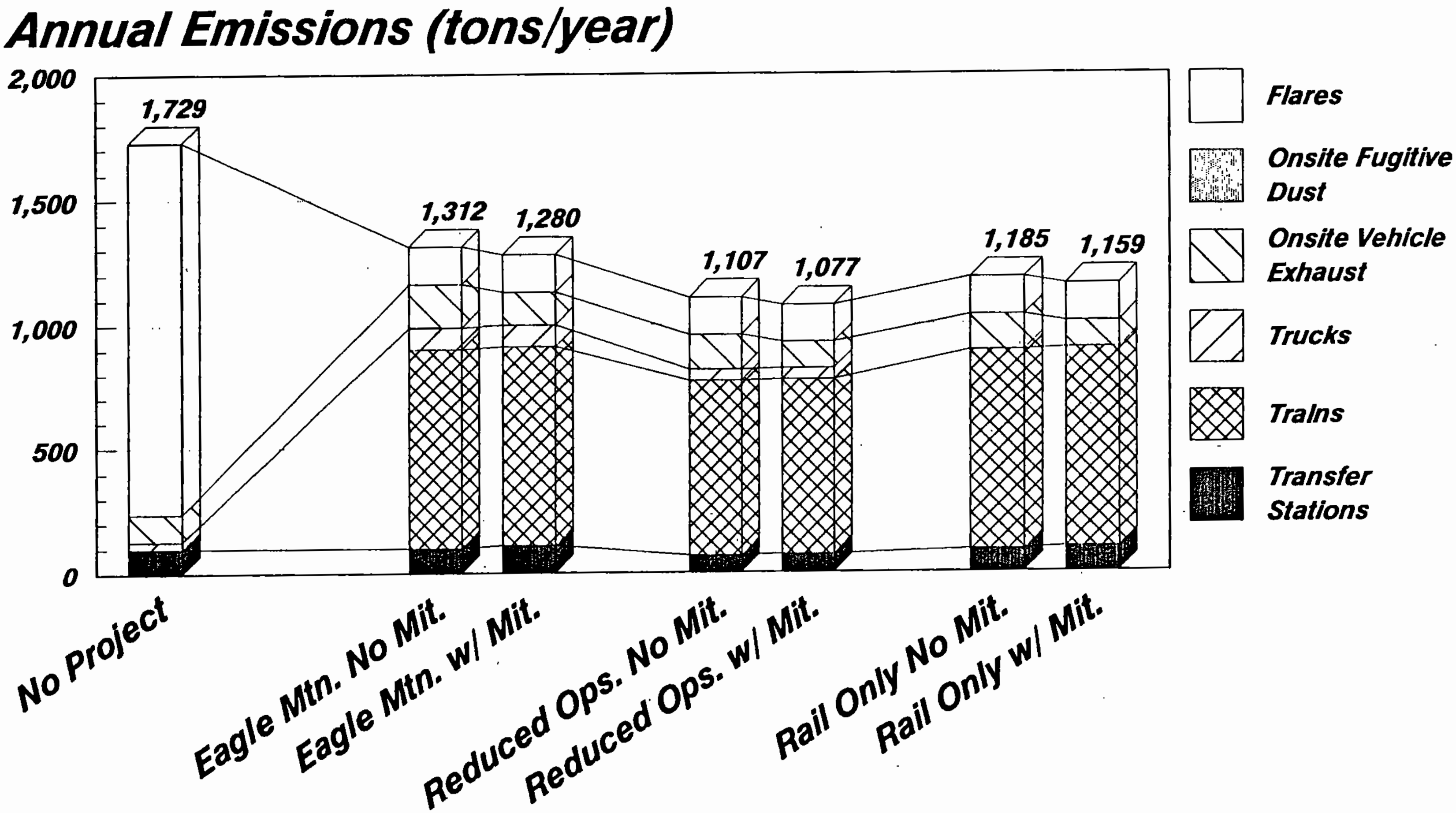
For carbon monoxide, each of the alternatives results in a decrease in emissions, as shown in Figure 36. This is due to the anticipated lower CO emission rate from new flares (or other combustion devices) equipped with oxidizing catalysts. This reduction would also be seen if gas generation rates in the drier desert climate prove to be lower than those currently experienced in the South Coast Air Basin.

The PM10 emissions from the alternatives are shown in Figure 37. The data indicate that total PM10 emissions are approximately equal, regardless of the alternative. The Reduced Operations and Rail Only Alternatives, with mitigation, result in slightly lower PM10 emissions than the No Project Alternative.

Figure 36

Eagle Mountain Project

Comparison of Alternatives - Carbon Monoxide

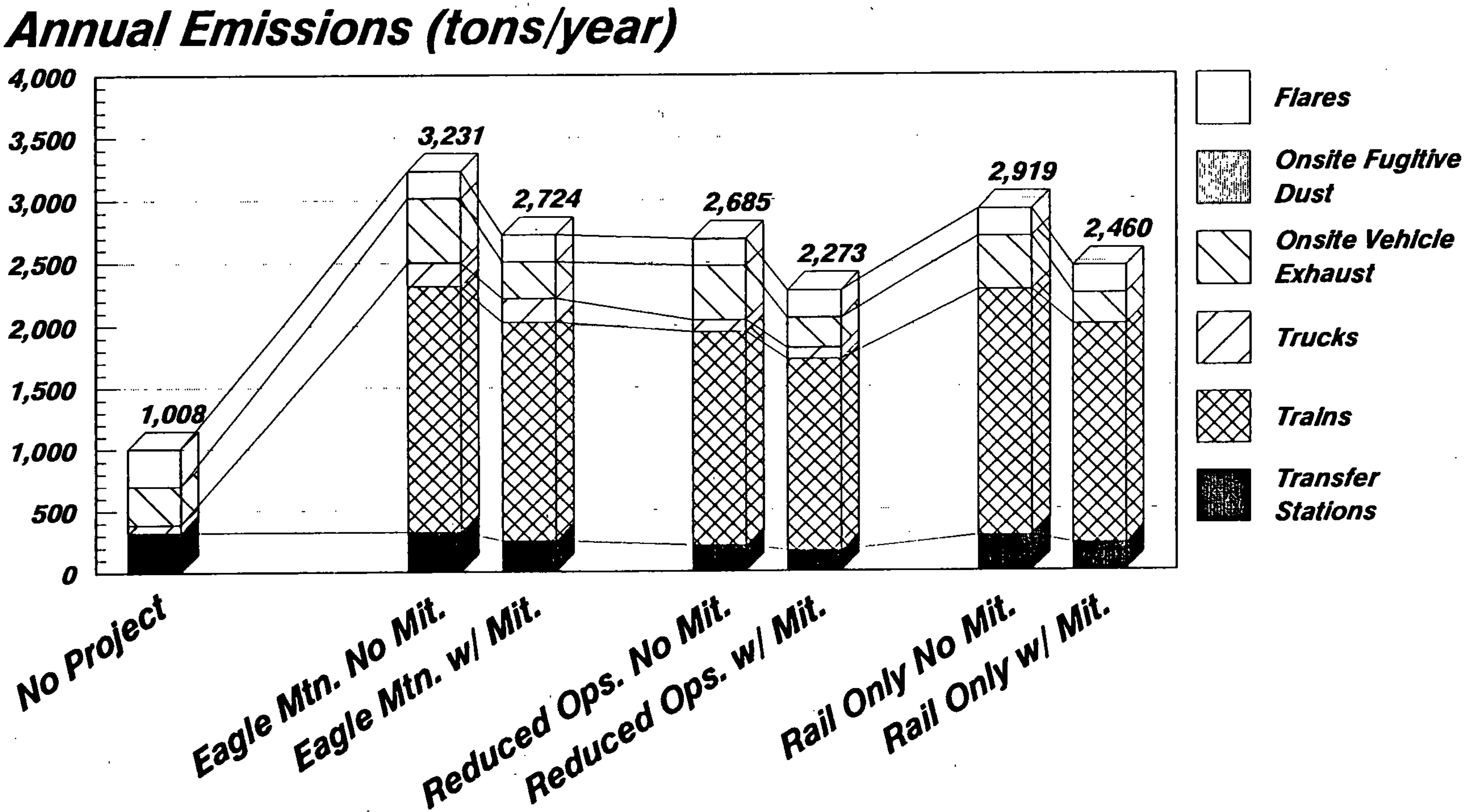


Sierra Research
August 1990

Figure 35

Eagle Mountain Project

Comparison of Alternatives - Oxides of Nitrogen



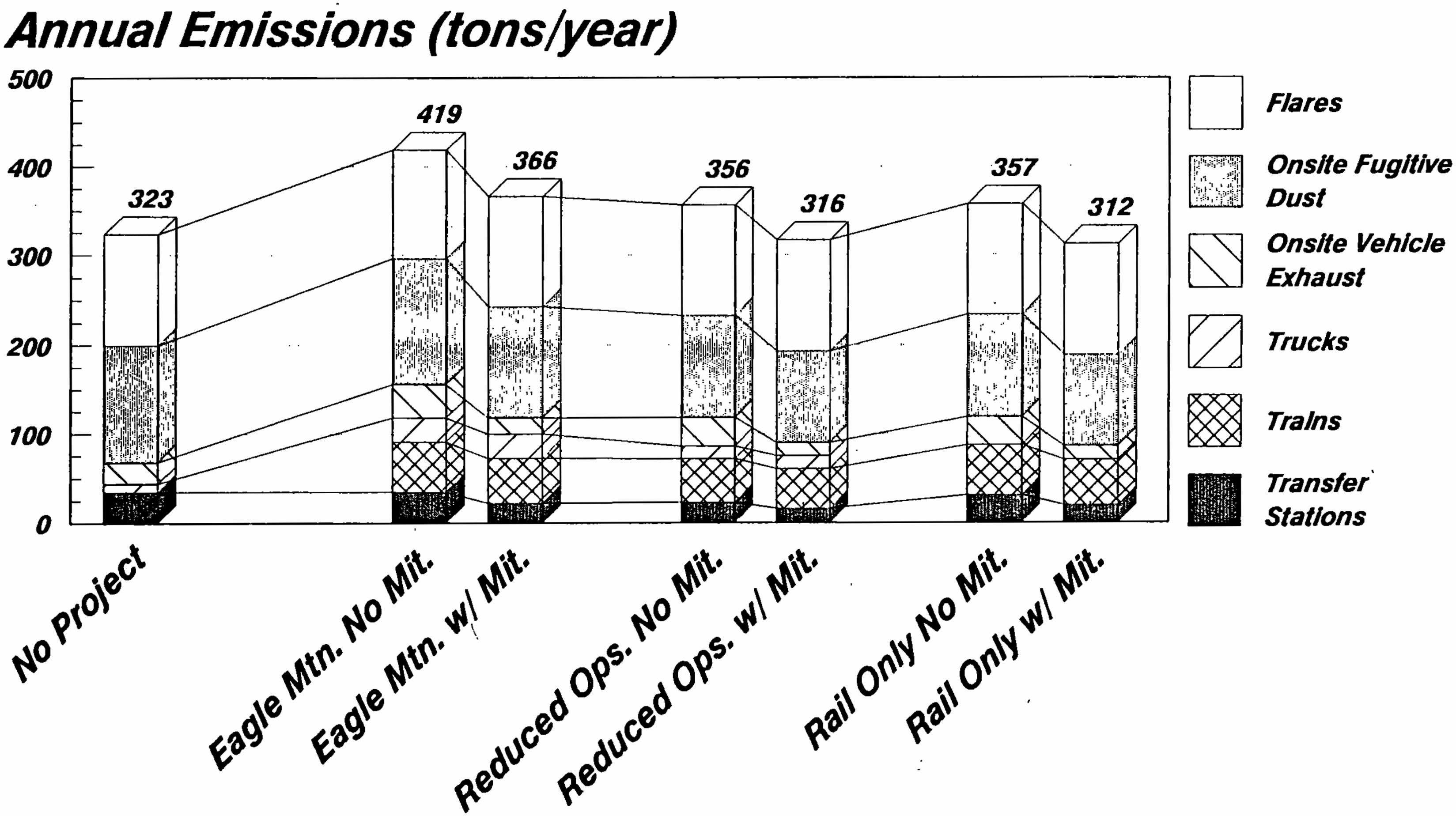
Sierra Research
August 1990

-199-

Figure 37

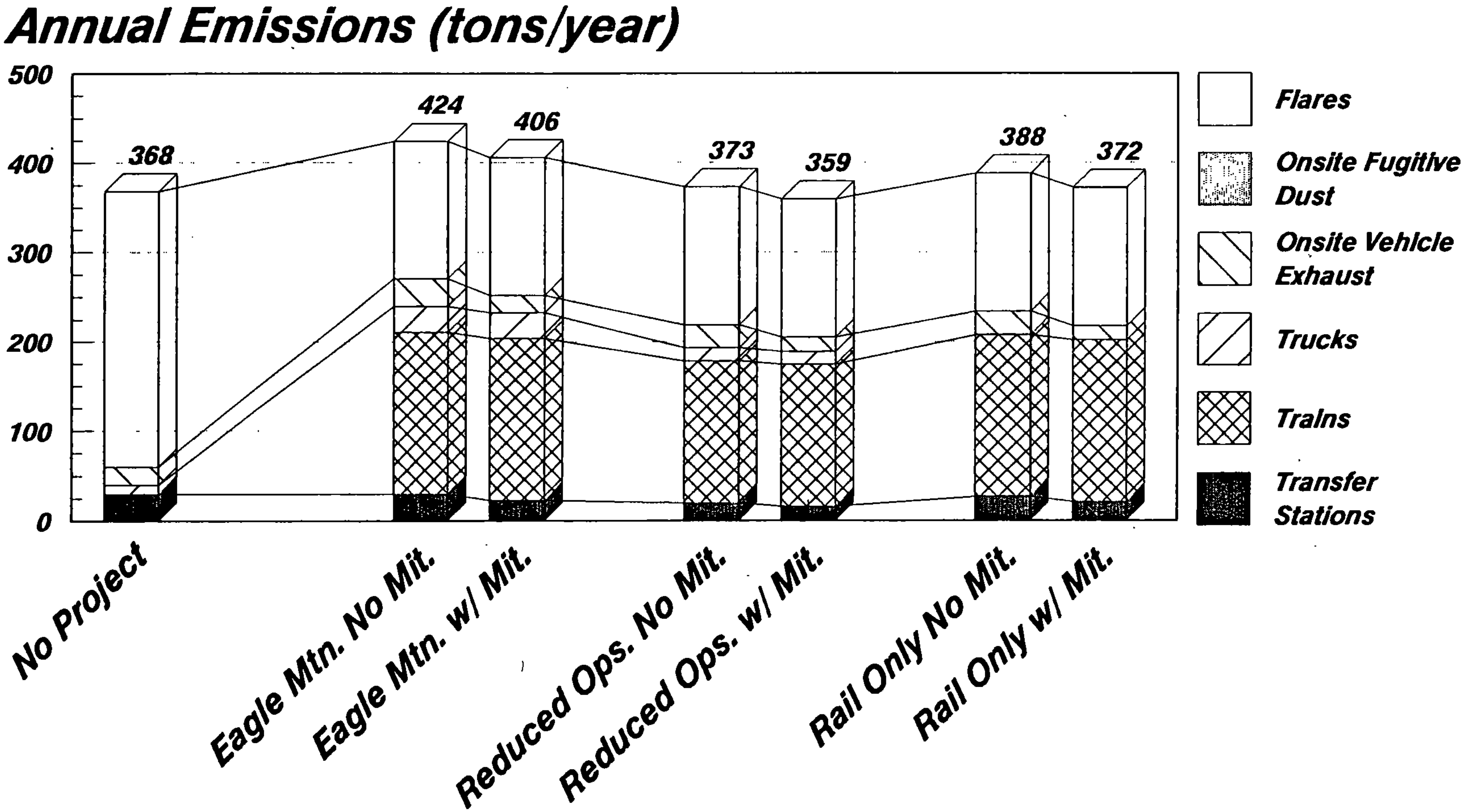
Eagle Mountain Project

Comparison of Alternatives - Particulates (PM10)



Sierra Research
August 1990

Figure 38
Eagle Mountain Project
Comparison of Alternatives - Hydrocarbons



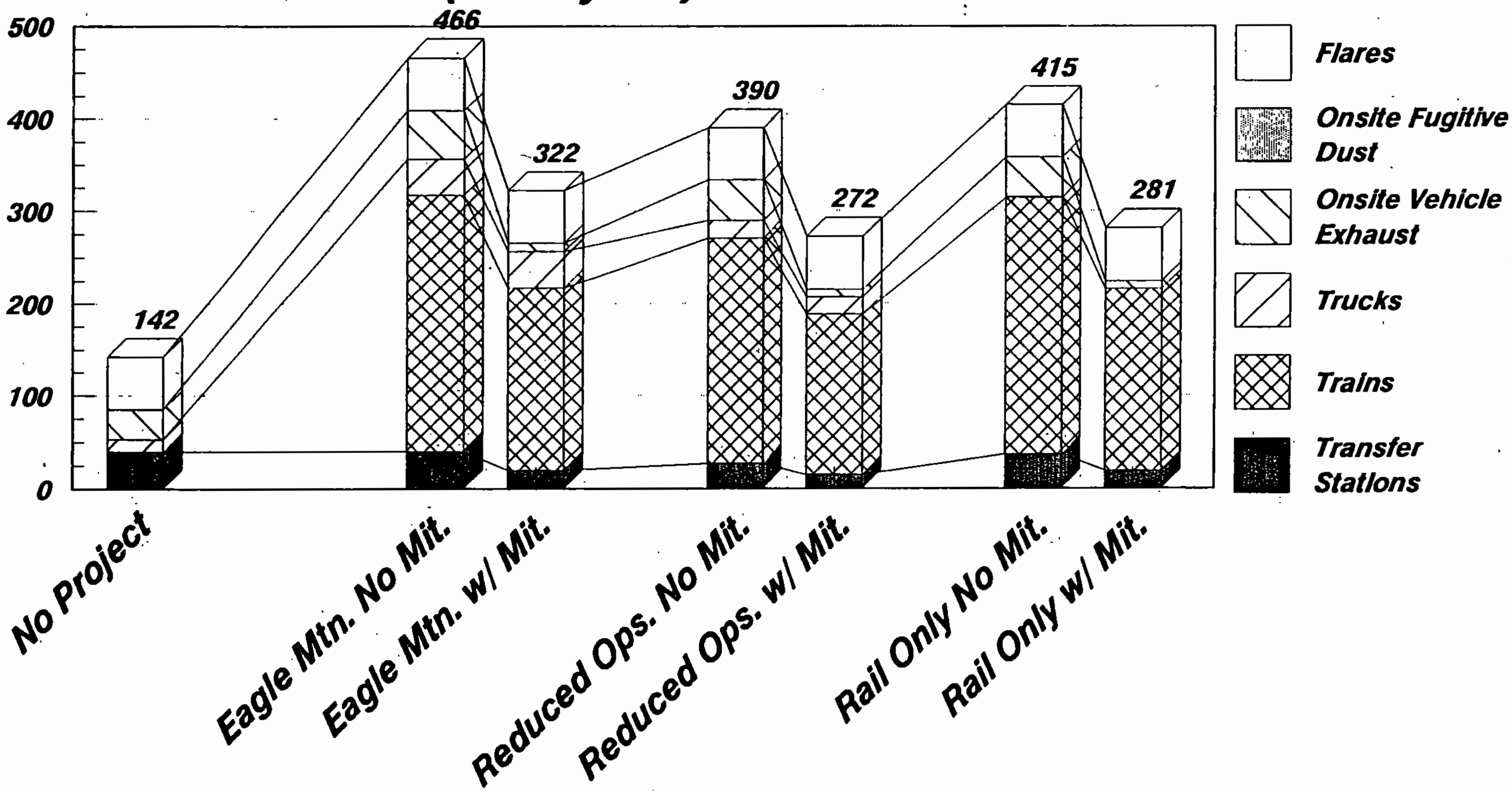
Sierra Research
August 1990

Figure 39

Eagle Mountain Project

Comparison of Alternatives - Sulfur Oxides

Annual Emissions (tons/year)



Sierra Research
August 1990

-203-

110

Non-methane hydrocarbon emissions data are presented in Figure 38. The results here are similar to those described above for particulates. Both of the 16,000 ton/day alternatives would result in HC emissions comparable to those under the No Project Alternative. The 20,000 ton/day operations would result in a small increase in emissions of this pollutant.

Sulfur oxides (SOx) emissions would be much higher under any of the alternatives, as shown in Figure 39. This is due to the use of sulfur-containing diesel fuel to transport 16-20 thousand tons of waste per day. The large reductions in SOx emissions associated with mitigation measures are due to the use of ultra-low sulfur fuel oil in all equipment owned or operated by Mine Reclamation Corp.

Figures 40-44 present the same data, separated for the two air basins in which air quality impacts would be felt.

Figure 40 shows the NOx emissions from the alternatives. The data indicate that NOx emissions in the South Coast Air Basin (SCAB) would be comparable under all of the alternatives to the No Project Alternative; the principal increase in NOx emissions comes in the Southeast Desert Air Basin. The Reduced Operations Alternative would actually result in lower NOx emissions in the South Coast Air Basin than the No Project Alternative; however, this conclusion must be viewed with caution, since the No Project Alternative disposes of 20,000 tons/day of waste, while the Reduced Project Alternative disposes of only 16,000 tons/day of waste. On an equivalent waste basis, the Proposed Action with mitigation results in a 118 ton/year increase in NOx emissions in the SCAB.

Figure 41 shows that CO emissions, both in total and in the SCAB, would be substantially reduced under all of the alternatives compared with the No Project Alternative. However, CO emissions would increase in the desert air basin.

With respect to particulates, Figure 42 shows that each of the alternatives would result in a substantial reduction in the South Coast Air Basin compared with the No Project Alternative. This is due to the relocation of the numerous particulate-emitting landfill operations to the desert site. Total particulate emissions are increased due to the increased transportation emissions.

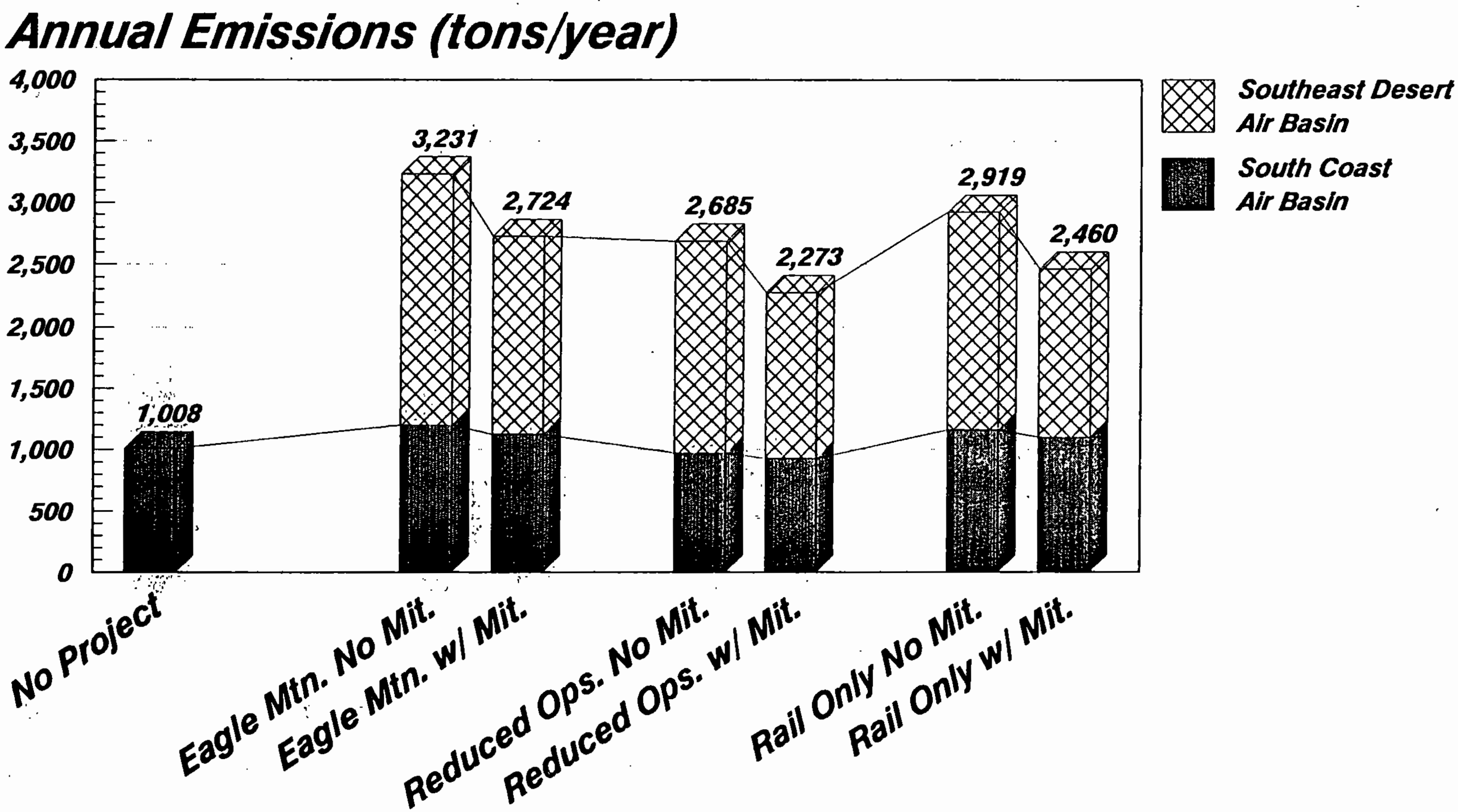
Figure 43 shows that HC emissions would also be substantially reduced in the SCAB under each of the alternatives as compared with the No Project Alternative. This is due largely to the relocation of flare gas emissions to the desert site.

Finally, SOx emissions in the South Coast Air Basin would be the same or slightly lower under each of the alternatives when compared with the No Project Alternative, as shown in Figure 44. This is due to a balance between increased SOx emissions from waste

Figure 40

Eagle Mountain Project

Basin Impacts - Oxides of Nitrogen

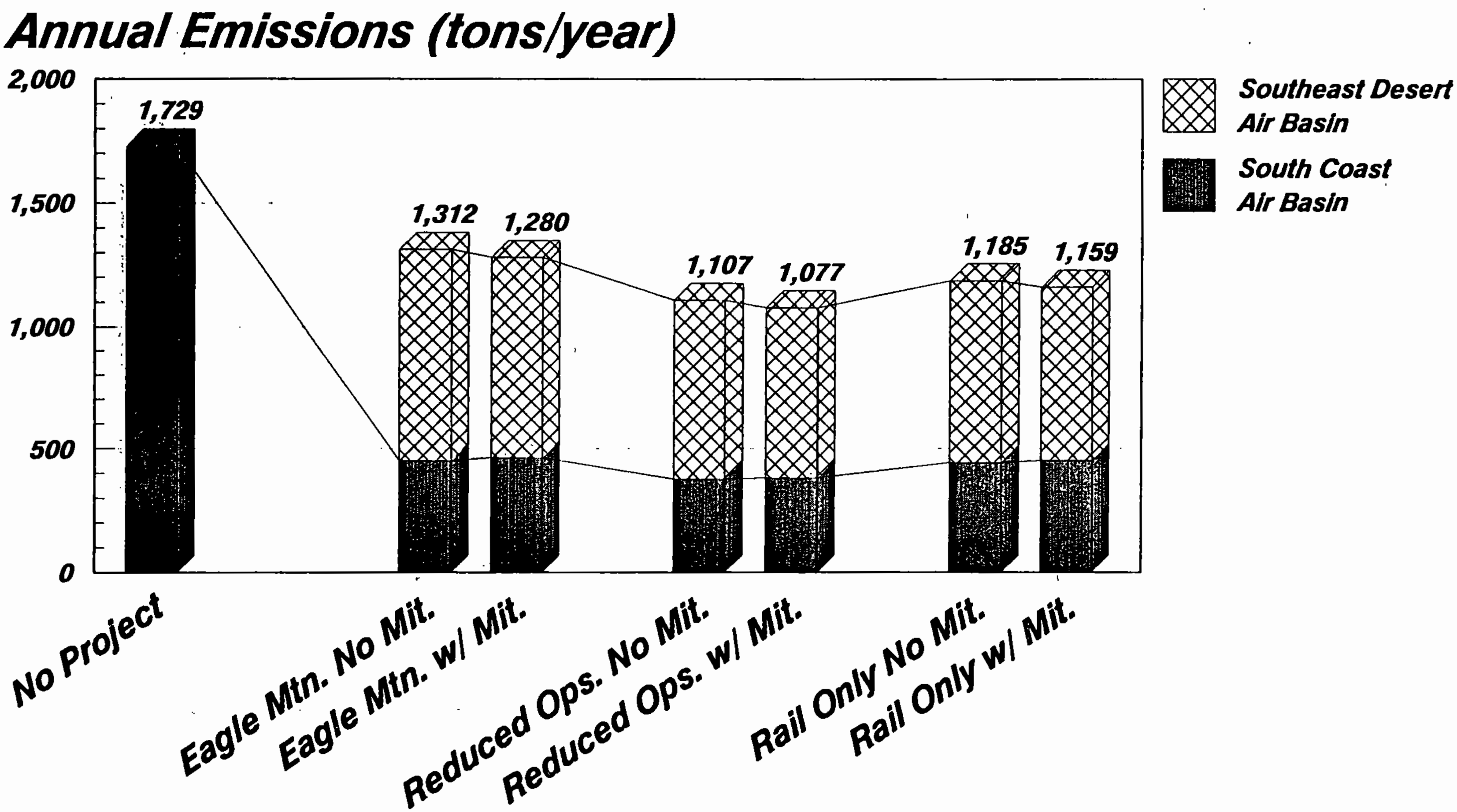


Sierra Research
August 1990

Figure 41

Eagle Mountain Project

Basin Impacts - Carbon Monoxide



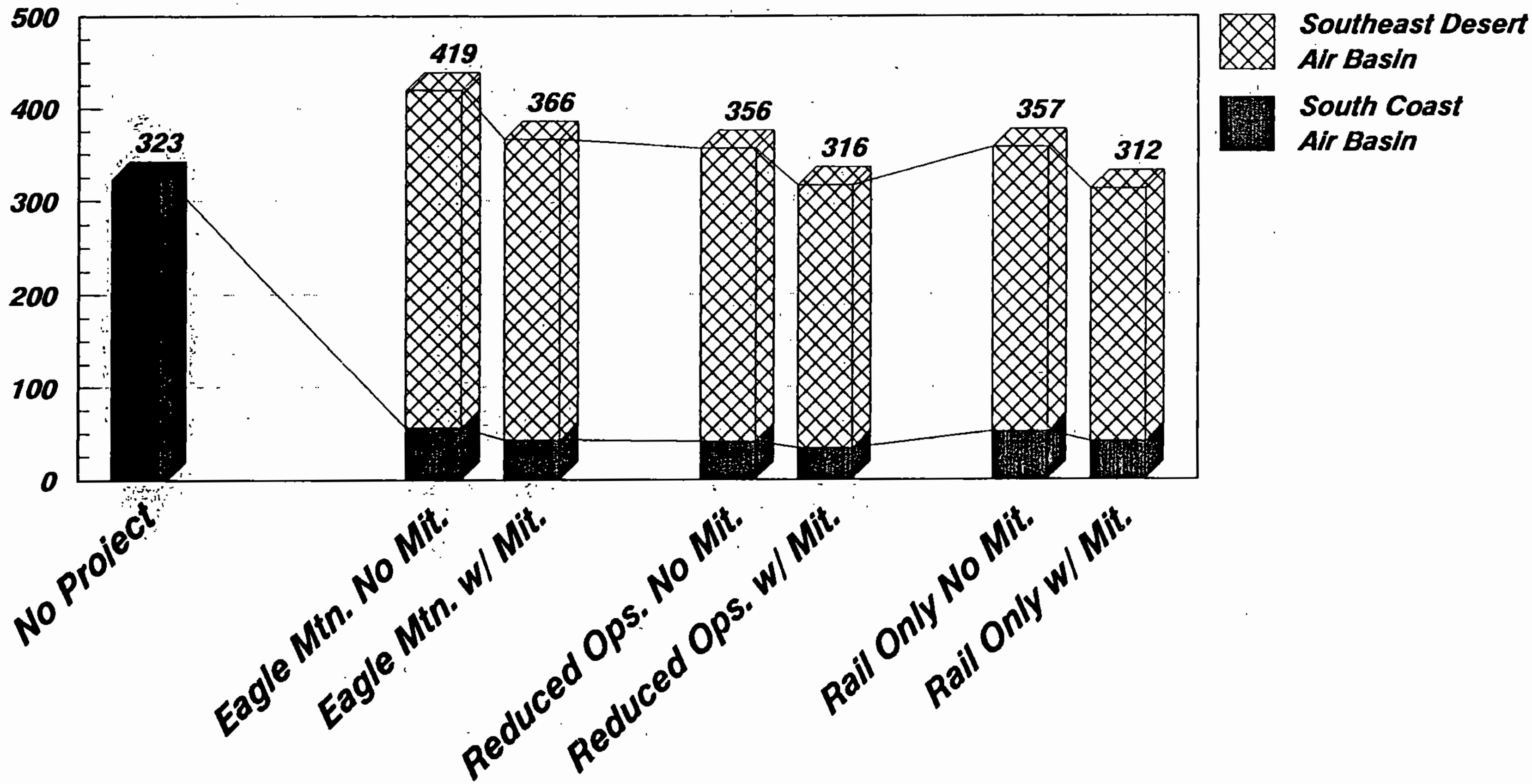
Sierra Research
August 1990

Figure 42

Eagle Mountain Project

Basin Impacts - Particulates (PM10)

Annual Emissions (tons/year)

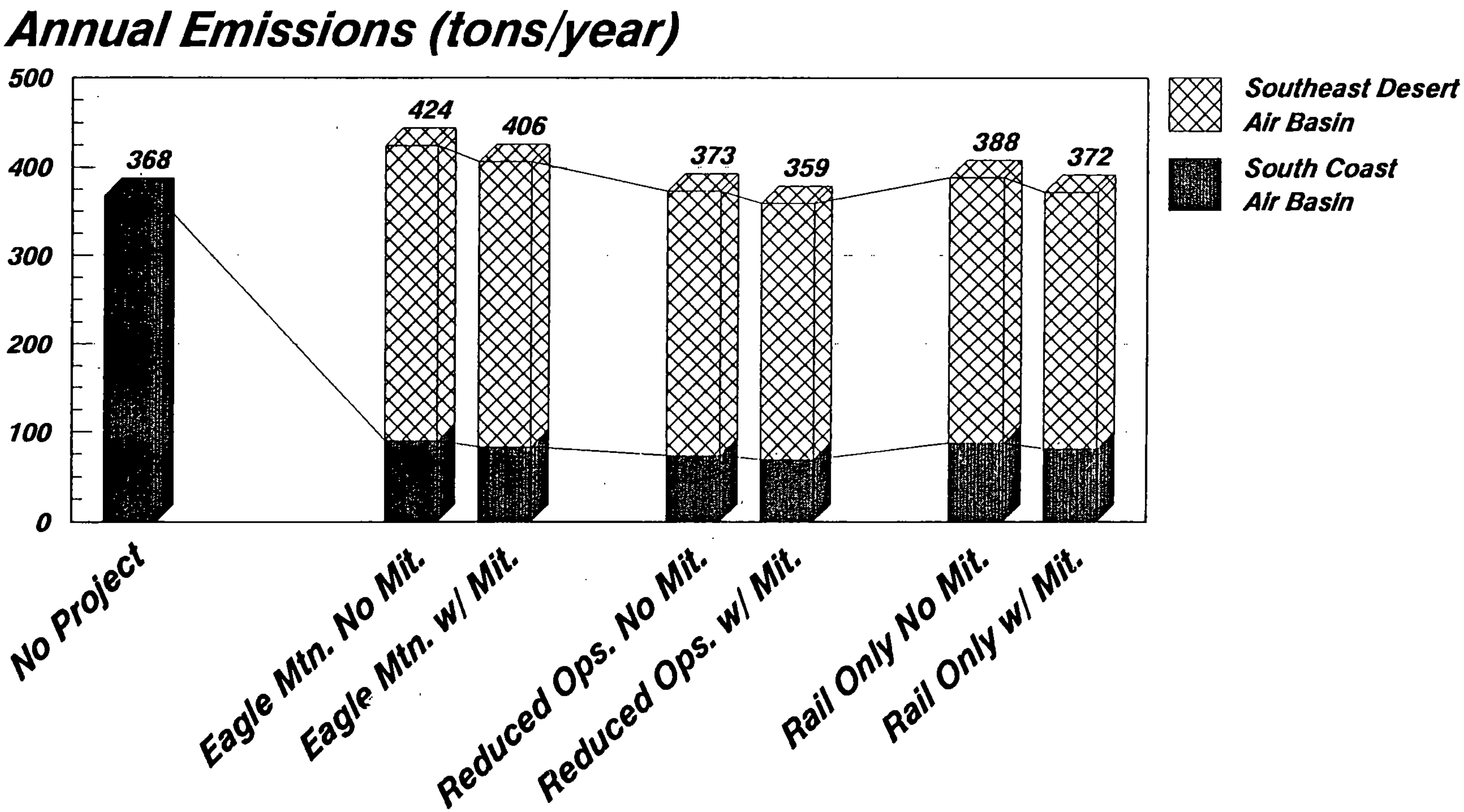


Sierra Research
August 1990

112

Figure 43

Eagle Mountain Project
Basin Impacts - Hydrocarbons

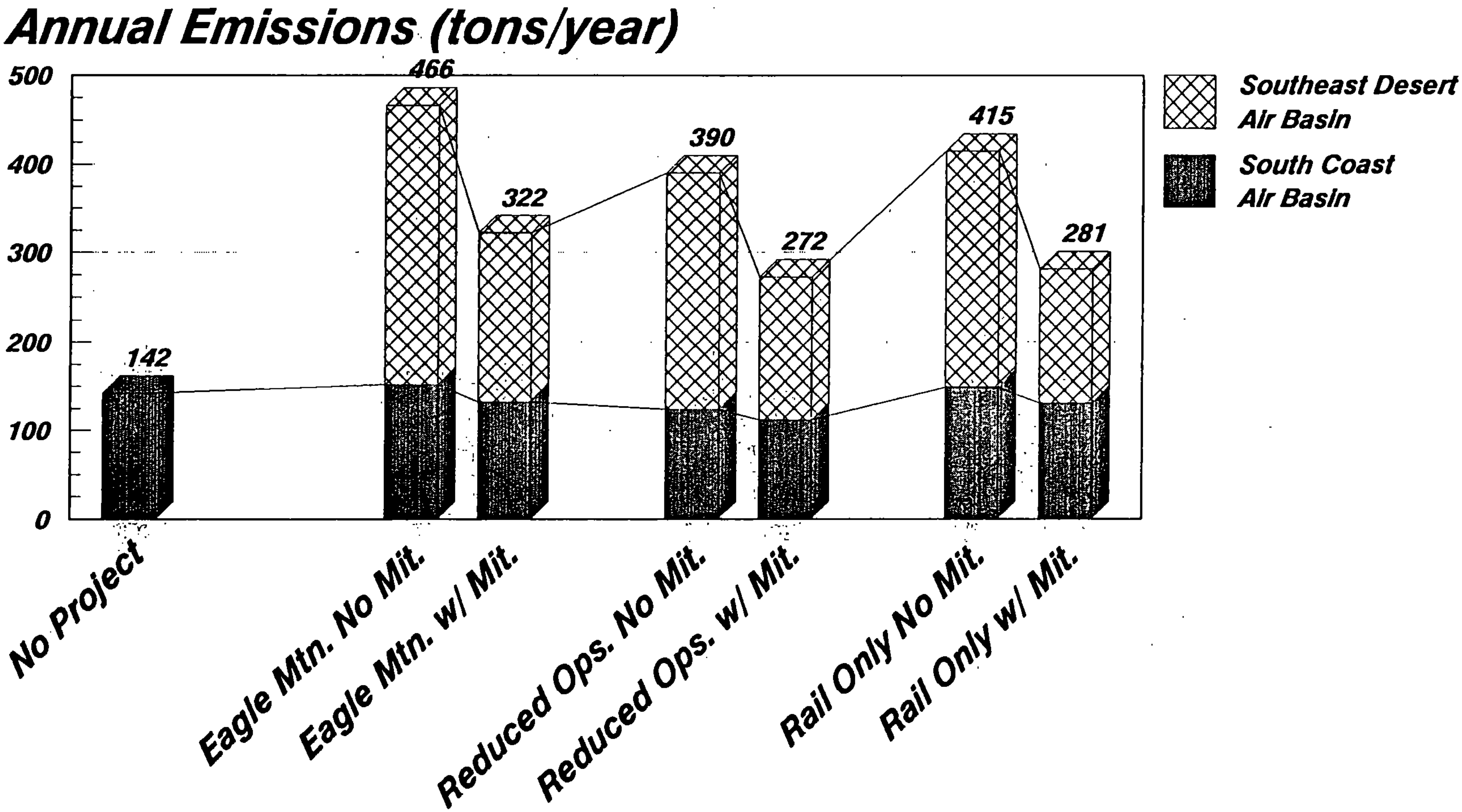


Sierra Research
August 1990

Figure 44

Eagle Mountain Project

Basin Impacts - Sulfur Oxides



Sierra Research
August 1990

transportation, and decreased SOx emissions associated with the relocation of waste handling operations from the South Coast Air Basin landfills to the desert site.

APPENDIX F

1114

BIOLOGICAL TECHNICAL REPORT
FOR
EAGLE MOUNTAIN LANDFILL PROJECT

Prepared for

MINE RECLAMATION CORPORATION
12440 EAST IMPERIAL HIGHWAY, SECOND FLOOR
NORWALK, CA 90650

Prepared by

DAVID N. LAWHEAD
ECOLOGIST

GERALD A. SCHEID
ECOLOGIST

NANCY C. NICOLAI
ECOLOGIST

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON NUMBER 2100B
JUNE 7, 1991

TABLE OF CONTENTS

FIGURES

1116

TABLE OF CONTENTS
(continued)

Page

FIGURES
(continued)

TABLES

I. SUMMARY

The proposed project is the establishment of a Class III (inert and municipal solid waste only) landfill at Eagle Mountain Mine using primarily the existing pit formerly operated as an iron ore mine. Waste generated in southern California will be transported to the project site by rail (maximum of six trains daily) and truck (200 two-way trips daily). The proposed project extends over approximately 4,659 acres in the Eagle Mountains and also includes 52 miles of Kaiser railroad right-of-way and the construction of an additional rail spur. Truck traffic would use the existing Eagle Mountain Road after road improvements are made, and a new road extension will be built along the eastern border of the landfill site. The last two miles of the Eagle Mountain Road extension will terminate at a work area east of the present ore pit. The railroad will also be realigned and a new spur will follow the Eagle Mountain Road extension to the work area. Other aspects of the proposed project are repair and maintenance facilities, systems for collection and disposal of leachate and landfill gas (LFG), and an energy recovery plant.

Within the proposed project boundaries are Bureau of Land Management (BLM) lands. The BLM proposes to transfer their holdings in the Eagle Mountain landfill project area to private ownership in exchange for private lands with biological resource values. These private lands, owned by Kaiser, were included in the biological resources assessment.

The federal- and state-listed threatened desert tortoise was observed in the study area. Sign of tortoises, and tortoises in burrows, were observed near the Eagle Mountain landfill site, Kaiser railroad corridor, and on most of the offered Kaiser property parcels.

One federal- and state-listed endangered species, desert pupfish, was captured in the Salt Creek tributary south of the Salt Creek railroad trestle in a 1990 survey by the California Department of Fish and Game (CDFG). Possible appropriate habitat exists under the trestle as well as up and downstream from the trestle.

Of the wildlife species of concern observed or detected, six were on the Eagle Mountain landfill site: desert tortoise, Nelson's bighorn sheep, California leaf-nosed bat, LeConte's thrasher, and black-tailed gnatcatcher. Six species (desert tortoise, bighorn sheep, LeConte's thrasher, black-tailed gnatcatcher, badger, and northern harrier) were found along the railroad corridor, and four species (desert tortoise, bighorn sheep, LeConte's thrasher, and black-tailed gnatcatcher) were on most of the Kaiser Steel Resources properties.

No listed state or federal plant species was observed within the bounds of the proposed project, and there is no indication of a potential for any state or federal listed plants to occur in the area. One Category 2 candidate plant species was observed within the proposed landfill project boundaries: Alverson's foxtail cactus. This cactus was observed along the railroad and Eagle Mountain Road corridor as well. A second Category 2 candidate plant species was observed within the right-of-way corridor of the railroad: Orocopia sage. Plant species of special concern observed within Kaiser Steel Resources parcels include a few individuals of California barrel cactus in the section north of Interstate 10 (I-10), and a population of Orocopia sage occurs in the parcels south of I-10. Two plant species were observed in the railroad corridor which appear only on California Native Plant Society (CNPS) lists: crucifixion thorn and unicorn-plant.

Impacts will occur to sensitive plants and wildlife on some of the selected public lands and on some of the private lands at the proposed Eagle Mountain landfill site, along the Eagle Mountain railroad right-of-way, and Eagle Mountain Road including the proposed road extension and rail spur. No anticipated impacts will occur on the Kaiser properties (offered properties) to be traded to the BLM. Significant impacts will occur to desert tortoise, Nelson's bighorn sheep, black-tailed gnatcatcher, California leaf-nosed bat, and Alverson's foxtail cactus. Impacts to three permanent water sources and several washes and drainages will occur at the proposed landfill site, along Eagle Mountain Road, and during maintenance construction of the railroad.

II. INTRODUCTION

A. ENVIRONMENTAL SETTING

The Eagle Mountain Mine is located along the northern edge of the Colorado Desert (Figure 1). The Colorado Desert is considered a northwestern extension of the Sonoran Desert, extending into Arizona, Baja California, and Sonora, Mexico. Features of the Colorado Desert are the Salton Basin, comprising the undrained Salton Sea, and the plains and bajadas of the lower Colorado River Valley (Burk 1977). General geological features of the area surrounding the project site are north to northwest trending mountain ranges with alluvium-filled basins and drainages between the ranges. A large number of Colorado Desert plants also occur in the Mojave Desert and Arizona Sonoran Desert. Several species only occur in the lower elevations of the Colorado Desert. Reduced summer rainfalls in the Colorado Desert limit the characteristic diversity and number of tree species found in the eastern portions of the Sonoran Desert.

Habitat Management Areas (HMAs), managed by the BLM, occur in the vicinity of the proposed project. BLM HMAs include desert tortoise habitat in the Chuckwalla Bench and Chuckwalla Valley, and three Nelson's bighorn sheep management areas. Two BLM Areas of Critical Environmental Concern (ACEC) are also in the vicinity of the proposed project boundary, south of I-10. The Eagle Mountain railroad right-of-way passes through the western extent of the Chuckwalla Bench ACEC, which has been established primarily for protection of the desert tortoise. The rail line also bisects the Salt Creek ACEC near Ferrum Junction, which has been established to protect the desert pupfish and Yuma clapper rail.

The proposed landfill site consists of 4,659 acres of private and public lands in the Eagle Mountains, and is comprised of rugged mountain terrain including the old mine pit, and tailing and overburden piles surrounding the open pit mine. Elevations range from 2,800 feet in the northeast portions of the site to 710 feet in the bottom of the mine pit. Elevations on the bajadas in the eastern and southern portions of the site range from 1,234 feet in the southwestern corner to 983 in the southeastern corner.

Eagle Mountain Road and the Eagle Mountain rail line traverse the bajadas of the eastern edge of the Eagle Mountains. The bajadas drain from west

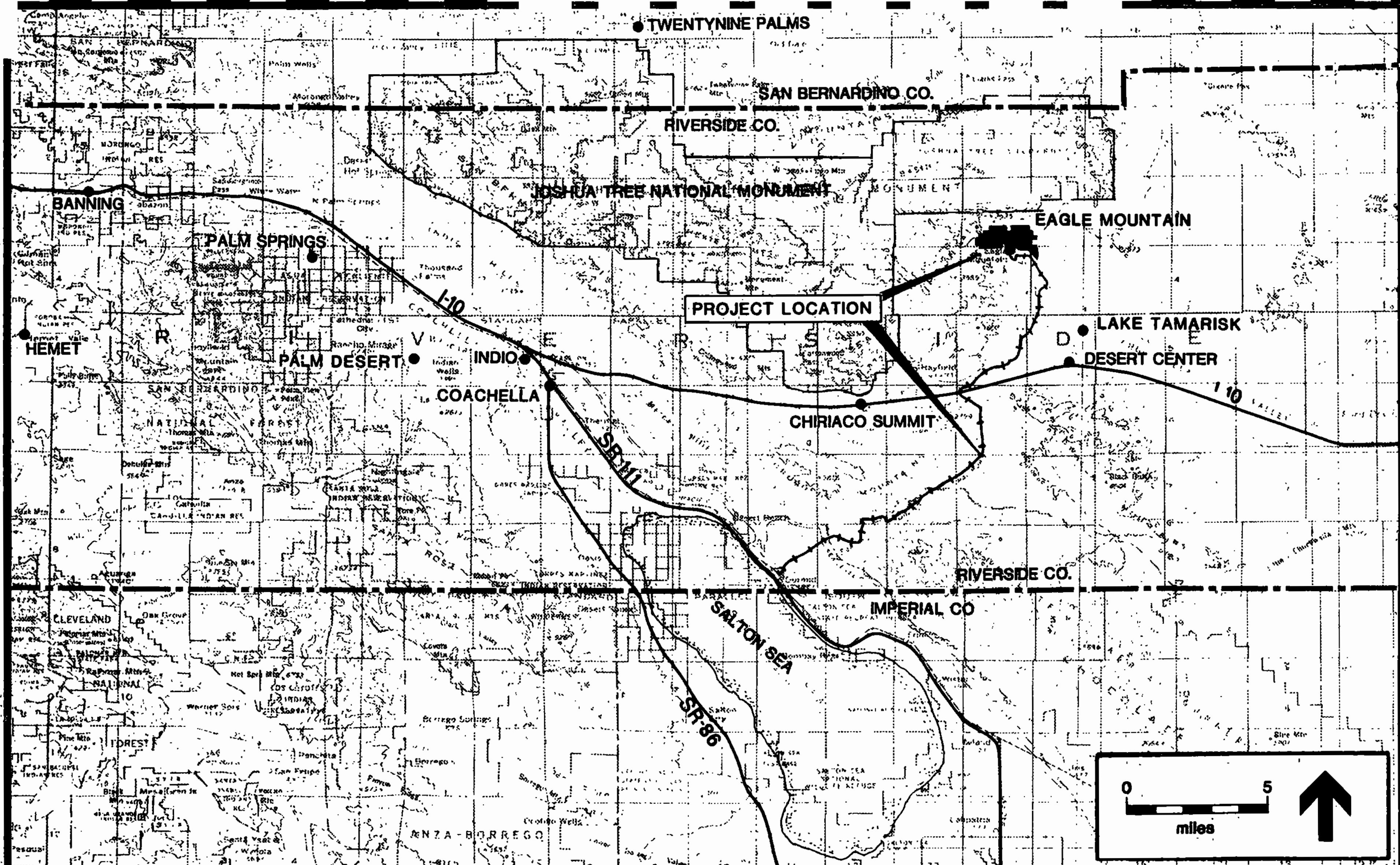


FIGURE 1. PROJECT LOCATION RELATIVE TO EASTERN RIVERSIDE COUNTY

RECON

R-2100E 2/91

to east. The railroad continues southwest of the Eagle Mountains and crosses Chuckwalla Valley and I-10. From the freeway the railroad continues south through the Chuckwalla Bench area and then runs between the Orocopia and Chuckwalla mountains along Salt Creek. The railroad follows the Salt Creek drainage between the Orocopia and Chocolate mountains heading in a southwesterly direction until the railroad connects with the Southern Pacific Railroad line at the northeast edge of the Salton Sea, at Ferrum Junction. Elevation along the Eagle Mountain rail line remains at approximately 1,500 feet until the railroad reaches Salt Creek. Elevation drops steadily to a low of 149 feet below sea level near the Salton Sea. Topography along the railroad is flat or gently sloping alluvial fans.

Drainage patterns on the Eagle Mountain landfill site generally flow from west to east, creating steep washes and drainages throughout the undisturbed portions of the site. South of Chuckwalla Valley, drainages flow from the Orocopia and Chuckwalla mountains and form alluvial fans descending toward Salt Creek. Salt Creek flows southwest, draining into the Salton Sea approximately one mile south of the Eagle Mountain railroad connection at Ferrum Junction. Many sandy, gravelly washes of varying sizes cross under the railroad from Chuckwalla Valley to the area where the railroad crosses the Coachella Canal.

Surface features within the mine area, along the railroad right-of-way, and along the Eagle Mountain Road extension range from sandy washes to steep, rock-covered slopes. Some of the flat areas on the upper bajadas have little soil and desert pavement predominates. The mountain areas are composed of metasedimentary and granitic rocks. The eastern portion of the proposed landfill area is within a valley composed of sedimentary soils of predominantly sand and gravel deposits derived from the surrounding mountains.

B. PROJECT DESCRIPTION

The proposed project is the establishment of a Class III landfill at a site consisting of approximately 4,659 acres of private and public (selected) lands in the Eagle Mountains in northeastern Riverside County (Figures 1 and 2). The site is approximately 10 miles north of Desert Center, 200 miles east of Los Angeles, and approximately 50 miles west of the Arizona border. The site is bordered on the north by the northeastern ridge of the Eagle Mountains, on the east by Chuckwalla Valley, on the south by the townsite community of Eagle Mountain, and on the west by the Eagle Mountains. Joshua Tree National Monument is approximately two miles north of the project site.

The landfill at Eagle Mountain Mine will primarily use the existing East Pit, formerly operated as an iron ore mine. Mine Reclamation Corporation (MRC) proposes to use portions of the mine site and associated tailing as a regional site for the land disposal of solid waste generated in southern California, and for retrievable storage of recyclable materials contained in municipal wastes. Transport of solid waste to the project site will be accomplished by rail (up to a maximum of six trains per day, or 12 one-way trips) and truck (400 one-way trips per day). Landfilling activities will occur during daylight hours only. Receiving yards for the solid waste will operate 24 hours a day. MRC has leased approximately 4,569 acres of the Eagle Mountain Mine and 52 miles of Eagle Mountain railroad right-of-way from Kaiser Steel Resources. MRC will operate the landfill and related facilities for approximately 115 years.

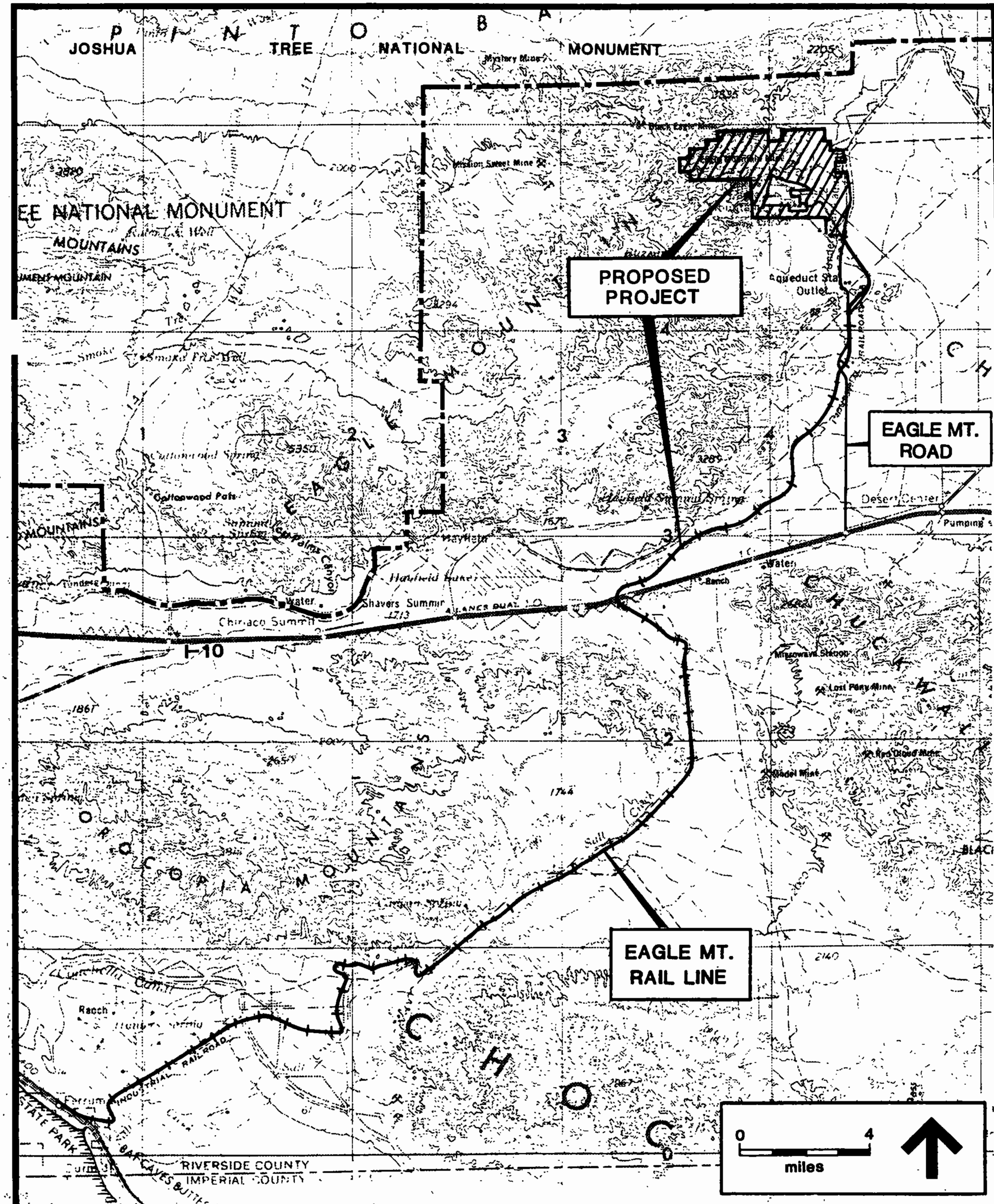


FIGURE 2. PROJECT LOCATION ON U.S.G.S. 1:250,000 SCALE MAP, SALTON SEA SHEET

RECON

R-2100E 2/91

Landfill operations would start in the central area of the East Pit. The landfill refuse would be covered daily each evening by a minimum thickness of six inches. Mine tailing, which are crushed rock and soil, are available on the site and would be used for the daily cover.

The proposed project includes 52 miles of existing Kaiser Steel Resources-owned railroad and right-of-way, which extends from Ferrum Junction on the northeast corner of the Salton Sea to the Eagle Mountain Mine (see Figure 2). In conjunction with the project, a new rail spur will be built from the current rail line southeast of the Eagle Mountain townsite to the proposed container handling yard on the eastern edge of the landfill project. The new spur will be approximately two miles long. Additional waste material will be hauled by trucks from I-10 north to the landfill site on the existing Eagle Mountain Road and a proposed extension of this road.

Truck traffic to the proposed landfill site would use the existing Eagle Mountain Road (County) and the Eagle Mountain Road extension (see Figure 2). The Eagle Mountain Road extension would provide access directly to the project site and run parallel to the proposed two and a half-mile rail spur extension.

Other support uses included in the proposed project, and located within the Eagle Mountain project site, are storage of recyclable materials, repair and maintenance facilities, and systems for the collection and treatment of leachate and LFG. Pollution control equipment and/or an energy recovery plant will be included in the LFG system.

Residential and other uses within the Eagle Mountain townsite are outside of the proposed project boundary and are not covered by the discretionary actions necessary for the landfill. Where these activities are related to the landfill and can have indirect biological effects, they are discussed.

The project area at Eagle Mountain Mine requires the creation of a Specific Plan Area within the Riverside County General Plan to permit the creation of this municipal landfill. Also, within the project boundaries are BLM lands. The California Desert Conservation Area (CDCA) Plan prohibits use of public lands for disposal of municipal waste. Therefore, BLM proposes to transfer their holdings to private ownership in exchange for private lands owned by Kaiser Steel Resources with resource values. This exchange will be carried out in accordance with the Federal Land Policies and Management Act. Those private lands, owned by Kaiser Steel Resources (hereafter called Kaiser Steel Resources properties), and offered for exchange, were included in this biological resources assessment.

Requirements for the closure of landfills incorporate rehabilitation of the land covering the landfill. At the end of landfill activity, the disturbed habitat will be modified to approximately original (pre-mining activity) grade and topped off with soils containing organic material and other suitable additives to encourage natural revegetation of desert scrub. Some postclosure activities will remain, including a water treatment plant, gas extraction wells, and an energy recovery system.

III. SURVEY METHODOLOGY

A. GENERAL

The purpose of the biological resource survey was to collect semi-quantifiable data to determine the level of impacts to habitats and species occurring or potentially occurring on the project site. The proposed Eagle Mountain landfill project site, including the 52-mile rail line and associated facilities as described above, was surveyed over a 12-day period from October 30 to November 11, 1989, and on November 28, 1989 and June 24, 1990, for a total of 69 person-days. Two additional surveys were conducted during the spring of 1990, for bats and desert pupfish. Survey dates, locations, and man-hours expended are listed in Table 1. Detailed descriptions of the survey methodologies used for each portion of the project are described below. The surveys are divided into foot surveys and specialized surveys. The project site is divided into the Eagle Mountain landfill site and the associated selected public lands, the Eagle Mountain railroad right-of-way, Eagle Mountain Road corridor and rail spur, and the Kaiser properties (Kaiser-owned parcels to be traded to the BLM or dedicated as compensation for significant biological impacts, also referenced as the "offered" lands).

1. Foot Surveys

All field surveys conducted for each portion of the project included a directed search for plant and animal species that are listed by state or federal agencies as threatened or endangered. These agencies include the U.S. Fish and Wildlife Service (USFWS) and the CDFG. Other plant and animal species considered sensitive by the CNPS, the California Natural Diversity Data Base (NDDB), and the BLM were also included in the searches. A total of 550 man-hours (69 man-days) were expended during this survey.

Prior to conducting the field surveys, data searches were performed using information obtained from the CNPS (Smith and Berg 1988), the NDDB, the BLM, CDFG, and USFWS to generate baseline information as to what significant species are known to occur in the study area. Field surveys centered on locating these significant species, as well as identifying new locations of any significant species of plant or animal with the potential for occurrence in the region.

The information lists used to generate the baseline data cover a wide variety of sources. CNPS maintains a list of the status of state and federal rare, threatened, and endangered plant species, which they publish periodically with updated information. Their list also includes plant species CNPS documents as being rare or of limited distribution, and those that require more information to determine status. Most information used by CNPS in these publications is included by the NDDB.

The NDDB is a program within the Natural Heritage Division of the CDFG that is an ongoing and continuously updated record of location information on rare or endangered species and natural biotic communities. A computer search of the NDDB list of sensitive species locations was conducted for the topographic quadrangles encompassed by the project boundaries and the associated facilities. The information was used to confirm specific known locations of significant biological resources on or near the project site.

TABLE 1
SUMMARY OF
EAGLE MOUNTAIN LANDFILL PROJECT SURVEYS
1989-1990

Location	Size	Dates	Man-Hours
Foot			
Mine area	4,659 acres	November 7, 8, 28 (1989)	104
Railroad	52 miles	October 30, 31 (1989) Nov. 1, 2, 3, 9, 10, 11 (1989)	312
Eagle Mtn. Rd.	13.5 miles	November 6 (1989), June 24 (1990)	54
Kaiser properties	4.4 sq. mi.	November 9, 11 (1989) January 30 (1990)	80
Total			550
Small-mammal trapping			
Railroad	Two 140-m trap lines (38 traps)	November 9 (1989)	
Kaiser property	One 4,000 sq. m. trap grid (38 traps)	January 30 (1990)	
Sensitive Bat			
Mine area	Adit, buildings, and water sources	May 25-28 (1990) December 2-7 and 14-16 (1990)	
Desert Pupfish			
	Eight traps in pond; 1.5 hours	May 21 (1990)	
	Salt Creek tributary 100 traps; 24 hours	June 8, 9, 16 (1990)	

Additional information on the distribution of important species in the vicinity of the project site was obtained from the California Desert Conservation Area Plan (CDCA) (BLM 1980), a list of BLM sensitive species in the area, a list of federally endangered species (updated August 1990) for Riverside County provided by the USFWS, listings of California State listed species (updated April 1990) provided by CDFG, recent biological assessments, and agency surveys (Anderson, pers. comm., 1989; Bleich, pers. comm., 1989; Nicol 1986; Bradstrom, pers. comm., 1989; Karl 1989; Bureau of Reclamation [BOR] 1989; Woodward-Clyde n.d.; Anderson 1983). Scientists, various agency personnel, and local residents were contacted regarding sensitive species sightings, pertinent research projects, and impacts observed to species potentially occurring within the vicinity of the project site.

Vegetation communities were mapped for all portions of the project site, the Eagle Mountain railroad right-of-way, the Eagle Mountain Road corridor, and the Kaiser Steel Resources properties. A checklist of plant species encountered was created. Some voucher specimens were taken back to the lab for identification. Important plant species locations were indicated on appropriate base maps used for each portion of the project site. A checklist of wildlife species was also created. Noteworthy wildlife species observations or their sign (such as scat, tracks, calls, or burrows) were marked on the same base maps as the sensitive plant sightings.

The results of the foot surveys were limited by seasonal and other factors. The size and rugged terrain of the Eagle Mountain Mine area made it difficult to survey all areas thoroughly; however, the surveys in the mine area were concentrated in those areas not disturbed by mining activities and contained within the proposed footprint of the future landfill project. As time permitted, other undisturbed areas outside of the project footprint were also surveyed. Surveys in the mine area were adequate to determine the presence of the significant species expected to occur on this portion of the project.

The botanical surveys, conducted during the fall, were sufficient to locate any federal-listed, federal-candidate, state-listed, and BLM-sensitive plant species with the potential for occurrence in the study area. Although spring surveys would increase the total number of plant species observed (mostly spring annuals), they would not likely produce significant changes to the results of the current surveys. This conclusion is based upon the number of significant species observed during the surveys in relation to the baseline information generated for the study area, which includes plant species documented to exist in the area and those with potential for occurrence. Only six of the potential plant species of concern are listed as federal candidate species as well as BLM-sensitive species. Each of these six species are perennials that would have been easily identified during the conducted surveys. Three were observed within the project area, one species which had the potential for occurrence was not observed within the project area, and two species have a very low probability of occurrence in the project area due to lack of appropriate habitat (see Section C. Biological Resources of Special Concern: 1. Plant Species).

Summer resident wildlife species that either migrate or hibernate during the winter, and which potentially may utilize the area, may not have been observed during the current survey. Other species, such as amphibians or reptiles, may have remained undetected due to their restricted temperature or

121

humidity-related behavior patterns. Many of these cold-blooded species remain inactive during extreme climatic conditions. Although burrows of the desert tortoise (*Gopherus agassizii*) are visible all year, direct observations of this species were limited because tortoises hibernate from November to March. Surveys conducted during daylight hours preclude direct observation of wildlife species active primarily at night, although sign of nocturnal wildlife is sometimes present.

2. Specialized Surveys

Livetrapping surveys were conducted to assess the presence of small-mammal species on a representative Colorado Desert scrub community along the Eagle Mountain railroad and on a Kaiser Steel Resources parcel. The railroad trapping was conducted approximately one-half mile south of I-10, and the Kaiser Steel Resource parcel trapping was located approximately five miles north of the Coachella Canal. Both surveys were conducted to enhance efforts to detect the assemblage of nocturnal species found in the general vicinity of the project site.

The railroad trapping grid had 28 Sherman folding live traps placed in two parallel trap lines approximately 10 meters apart for a trap line length of 140 meters. Each trap was baited with wild bird seed, placed and opened at dusk, and then checked the following morning. Data were collected on species trapped, sex, reproductive condition, hind foot length, and tail length. The Kaiser property trapping grid consisted of four lines of seven traps each for a total of 4,000 square meters.

Two surveys for desert pupfish were conducted to determine its occurrence in appropriate habitat on the south end of the railroad. Surveys were conducted in the spring when the highest number of adults and young are distributed in ponds and streams. The tributary of Salt Creek has permanent water flowing under the railroad tressel. This tributary was surveyed for pup-fish on June 8, 9, and 16, 1990 by Allen Schoener (Schoener, pers. comm., 7/90). One hundred traps were baited and placed in the water for 24 hours before checking for fish. Data were collected on the number of each species collected.

A two-acre, alkali pond, located approximately one-quarter mile north of the Salt Creek tributary, was surveyed for pupfish on May 21, 1990. Eight minnow traps were placed randomly along the western shore of the pond, baited with canned cat food, and left submerged for 1.5 hours in the afternoon. Traps were carefully hauled into shore underwater and then quickly checked for fish to prevent the fishes' desiccation. The trapping was conducted by Kim Nichol, CDFG fisheries biologist.

Bat surveys were conducted by Dr. Pat Brown on May 25-28, 1990, and in December of 1990, to determine the presence/absence of species of concern in the mine area. The report prepared for this survey is included in Attachment 1. All appropriate mine shafts, buildings, and water sources were surveyed for bat use, with special emphasis placed on locating any night and day roosting sites, maternity roosting sites, and winter roosts. Survey methods included walking into adits and buildings during the day, mist-netting at night, use of a bat detector and a night vision scope. A detailed description of the methods and location of use are in Attachment 1.

B. EAGLE MOUNTAIN LANDFILL SITE SURVEY

Surveys were conducted on foot, in representative habitats and topographic areas, to obtain a sample of information from both the private and public (selected) lands on the project site. Initial surveys were concentrated in undisturbed areas of the proposed landfill site that were within the footprint of the landfill project. Existing roads and trails were used to gain access to these undisturbed portions of the site. From a departure point on a road, surveyors walked a loop route covering both ridges and ravines. Departure points were selected to obtain the most coverage of this rugged terrain. Figure 3 shows the survey routes. A triangle of area was surveyed in the approximate location of the proposed railroad spur and Eagle Mountain Road extension using the same methodology. Directed searches were made for significant plant and wildlife species, and in particular sign of bighorn sheep. All known permanent watering sites within the project boundaries were surveyed for sign of bighorn sheep. Buildings and mine tunnels encountered were searched for signs of bats.

In the flatter portions of the proposed landfill area, and in undisturbed desert scrub habitat, searches were made for desert tortoise. In areas observed to be potential tortoise habitat, surveys were conducted by walking meandering loops throughout the habitat. Noteworthy wildlife species sightings and their sign, as well as significant plant sightings, were mapped on 1,000-foot scale aerial photographs.

C. EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY SURVEY

The Eagle Mountain railroad right-of-way survey was conducted on foot along the entire length of the 52-mile rail line. A 100-foot-wide swath within the rail right-of-way was walked in a meandering line on both sides of the railroad and included the area between the rails. Surveys were conducted with one surveyor on each side of the railroad and one surveyor (approximately 25 miles of the railroad) directly on the railbed. Directed searches were made for significant plant and wildlife species, especially sign of desert (e.g., tortoise burrows, pallets, scat, tracks, shell fragments, and individuals). Tortoise pallets are temporary or daily-use beds the animals use during activity throughout the day. Noteworthy plant and wildlife sightings, or their sign, were mapped on U.S.G.S. 7.5-minute topographic maps.

D. EAGLE MOUNTAIN ROAD CORRIDOR SURVEY

Eagle Mountain Road was surveyed on foot noting potential habitat for important plant and animal species. The foot surveys were conducted by walking a meandering line along a 200-foot-wide corridor with the existing road as the centerline. The first two miles of the road, beginning in the north, were surveyed by walking the route with one surveyor on each side of the road. The habitat continued unchanged and appeared to be inappropriate for desert tortoise, and sightings of significant plant species were sporadic; therefore, the remainder of Eagle Mountain Road was surveyed by making frequent stops along the road. At each stop, two surveyors explored a 100-foot corridor on each side of the road. Eagle Mountain Road was surveyed on-foot from I-10 north for four miles. At this point sporadic surveys were again conducted to the intersection of the Eagle Mountain Road with the Eagle Mountain Road extension. Sightings of species of special concern, or their sign, were mapped on U.S.G.S. 7.5-minute topographic maps.

12

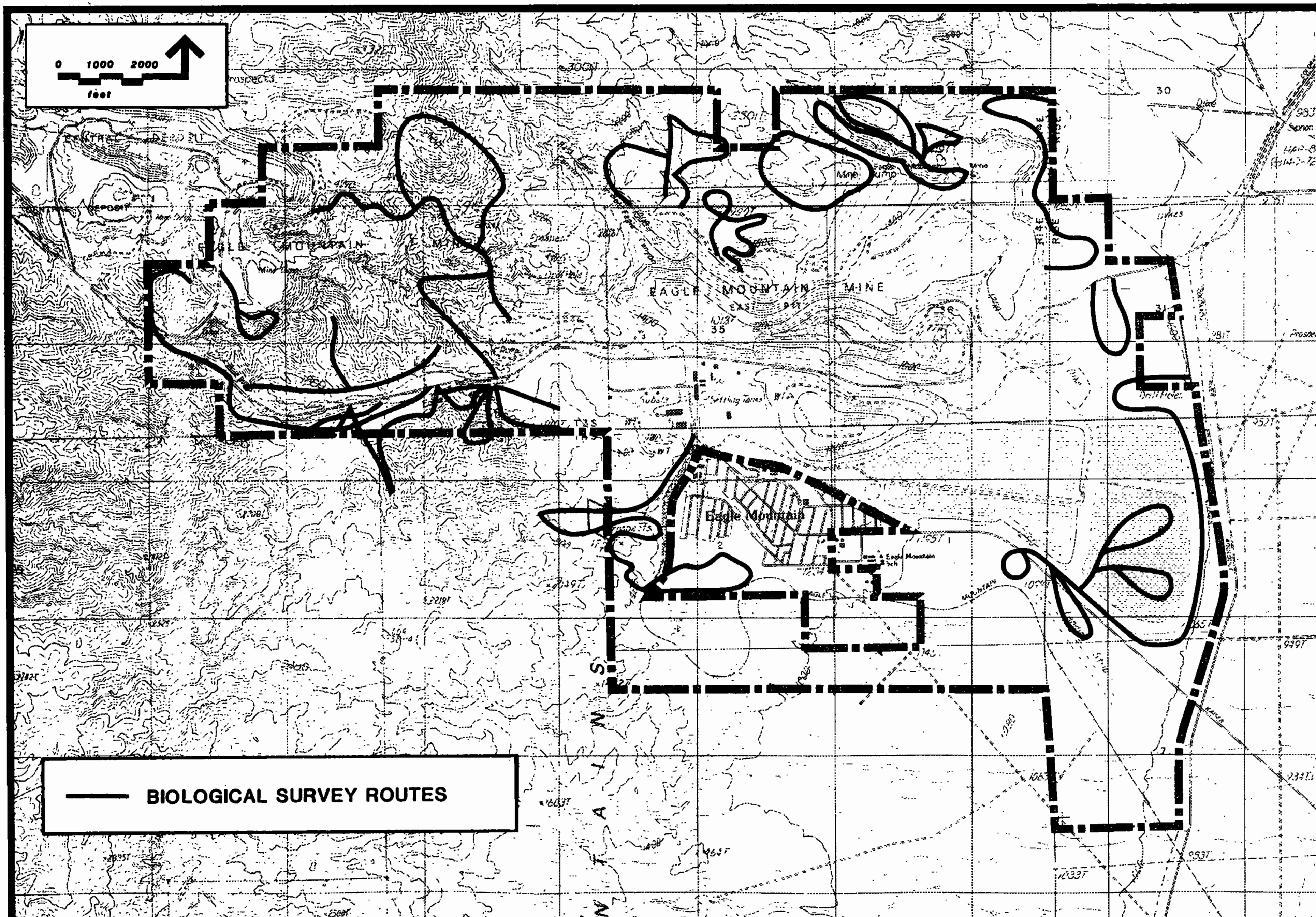


FIGURE 3. PROPOSED EAGLE MOUNTAIN LANDFILL SITE BIOLOGICAL SURVEY ROUTES

RECON

E. KAISER STEEL RESOURCES PROPERTIES SURVEY

The offered Kaiser Steel Resources properties (offered lands) were assessed for biological resources by conducting foot surveys consisting of parallel transects approximately one-quarter mile apart. Directed searches were made for significant plant and wildlife species, especially desert tortoise and its sign. Noteworthy species sightings or sign were mapped on U.S.G.S. 7.5-minute topographic maps.

IV. EXISTING CONDITIONS

A. HABITATS

The vegetation within the survey limits of the project can be described in three general plant communities: Sonoran creosote bush scrub, desert dry wash woodland, and desert chenopod scrub. Plant community names and descriptions follow those used by CDFG (Holland 1986). Elements from both the Mojave and Colorado deserts (a division of the Sonoran desert) are represented in the flora due to the location of the project within the transition zone between these two desert regions. Habitat categories are discussed in detail below and their locations in the project area are shown on Figures 4a-c and 5a-e. Plant species nomenclature follows Munz (1974) and Jaeger (1969). The plants observed on the site are listed in Table 2.

1. Sonoran Creosote Bush Scrub

The most prominent community type represented in the study area is Sonoran creosote bush scrub. This vegetation type is common on nearly all the lower slopes, bajadas, and sandy flats in the project area. The dominant plant in this community is the creosote bush (*Larrea tridentata*). Creosote bush is present in monotypic stands in certain areas throughout the project area; however, it is commonly associated with two other shrub species, cheese-bush (*Hymenoclea salsola*) and bur-sage (*Ambrosia dumosa*). Smaller subshrubs found in spaces between the dominant shrubs include desert straw *(Stephanomeria pauciflora)*, sweet bush (*Bebbia juncea*), jojoba (*Simondsia chinensis*), white and little-leaved ratany (*Krameria grayi* and *K. parvifolia*, respectively), and shadscale (*Atriplex canescens*).

The lower bajadas and flats within this community type have a greater abundance of cactus species than the Salton Sink or steep rocky slopes of the Eagle Mountains. The most common species of cacti are the golden cholla (*Opuntia echinocarpa* var. *echinocarpa*) and pencil cholla (*Opuntia ramosissima*). Beavertail cactus (*Opuntia basilaris*), hedgehog cactus *(Echinocereus engelmannii)*, and nigger-heads cactus (*Echinocactus polycephalus*) also occur in the area, but at much lower densities.

Small areas of Sonoran mixed woody and succulent scrub occur within the area mapped as creosote bush scrub. These localized areas are more common in areas halfway between the existing Eagle Mountain Mine and the Salton Sea adjacent to the Eagle Mountain rail line. This community type is recognized by the presence of larger numbers of individuals of the following species: ocotillo (*Fouquieria splendens*), golden cholla, pencil cholla, Mohave yucca (*Yucca schidigera*), and catclaw shrubs (*Acacia greggii*).

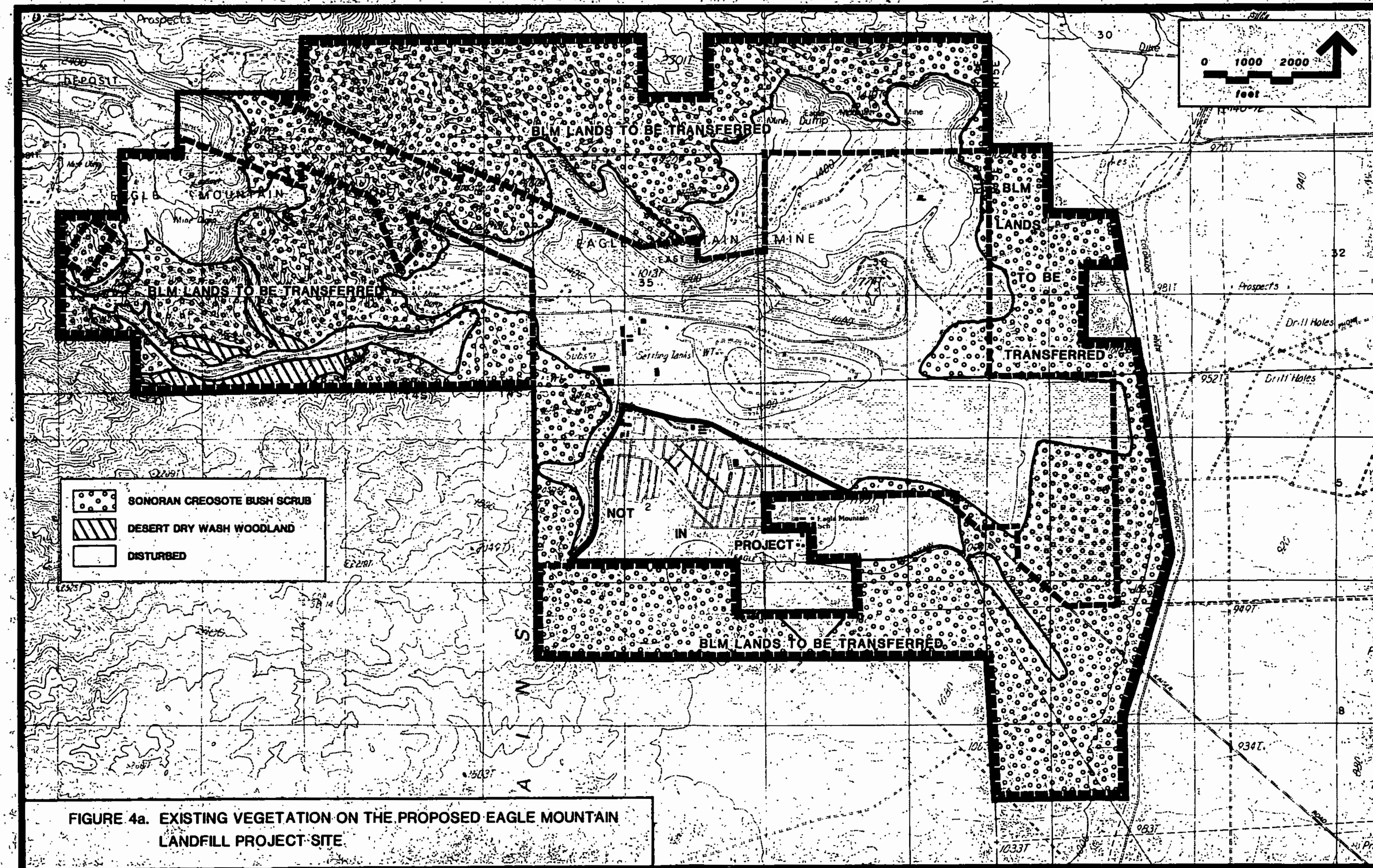


FIGURE 4a. EXISTING VEGETATION ON THE PROPOSED EAGLE MOUNTAIN LANDFILL PROJECT SITE

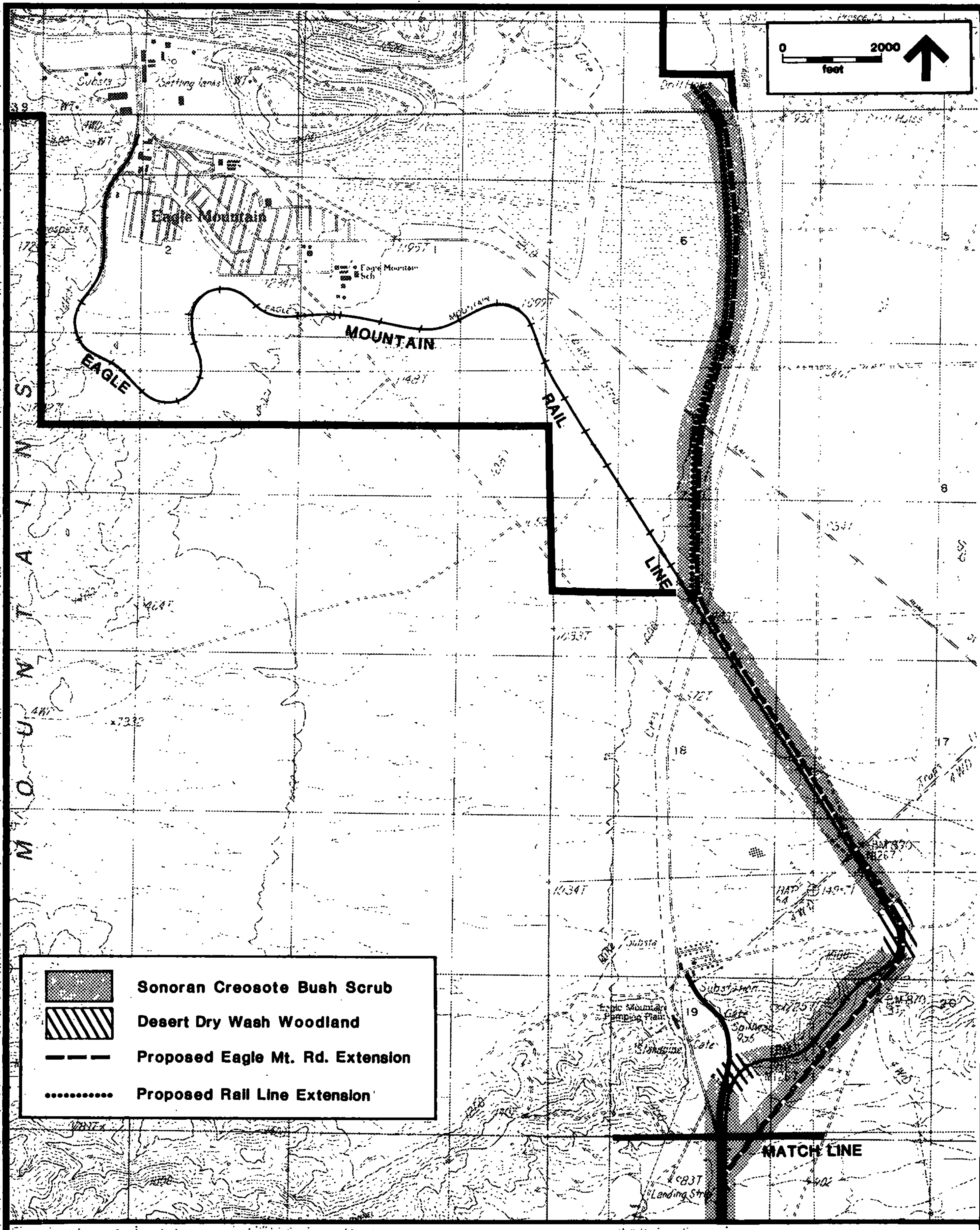


FIGURE 4b. EXISTING VEGETATION ON EAGLE MOUNTAIN ROAD EXTENSION AND RAILROAD SPUR MAP 2 OF 2

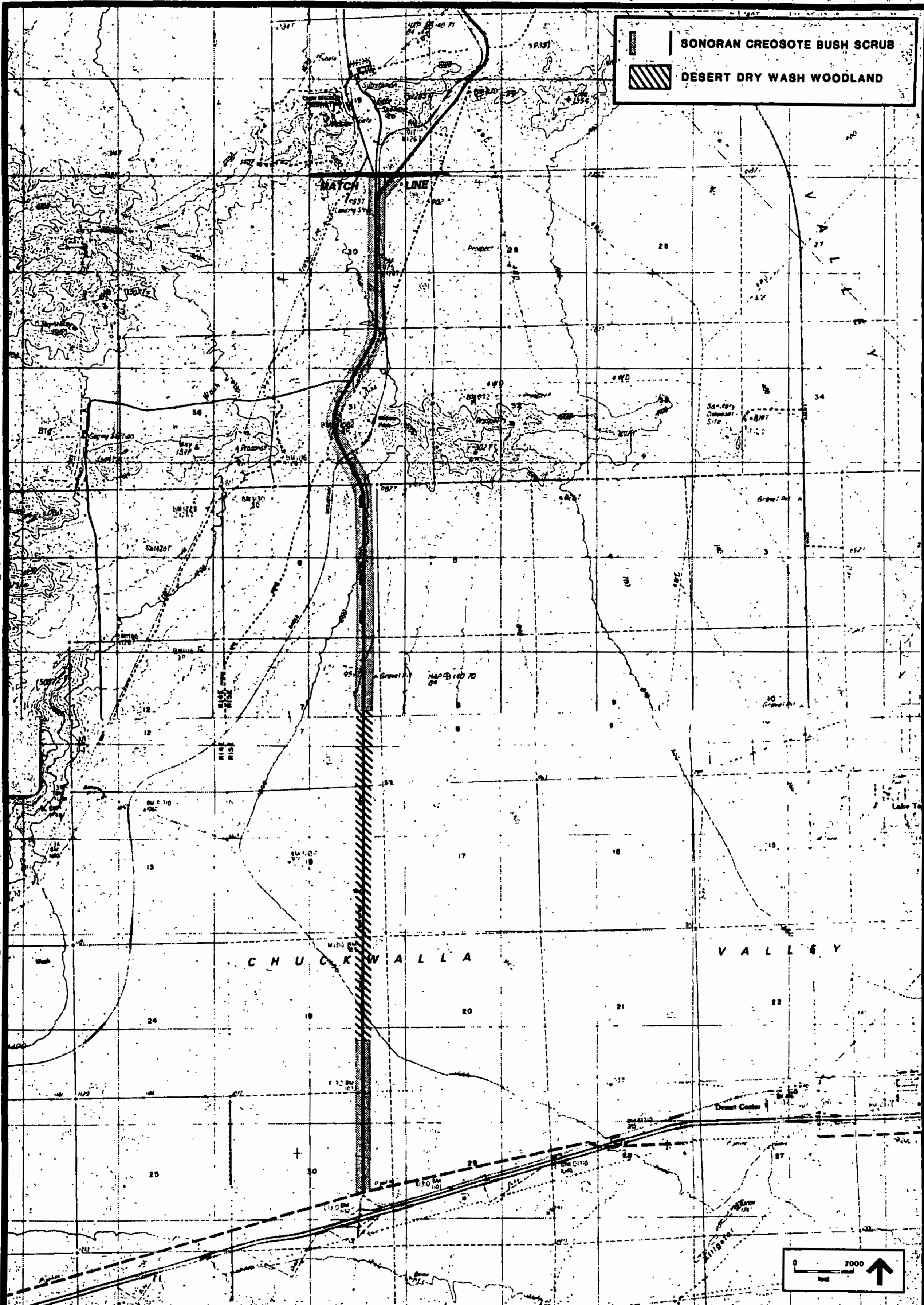


FIGURE 4c. EXISTING VEGETATION ON EAGLE MOUNTAIN ROAD

R-2100 7/90

RECON

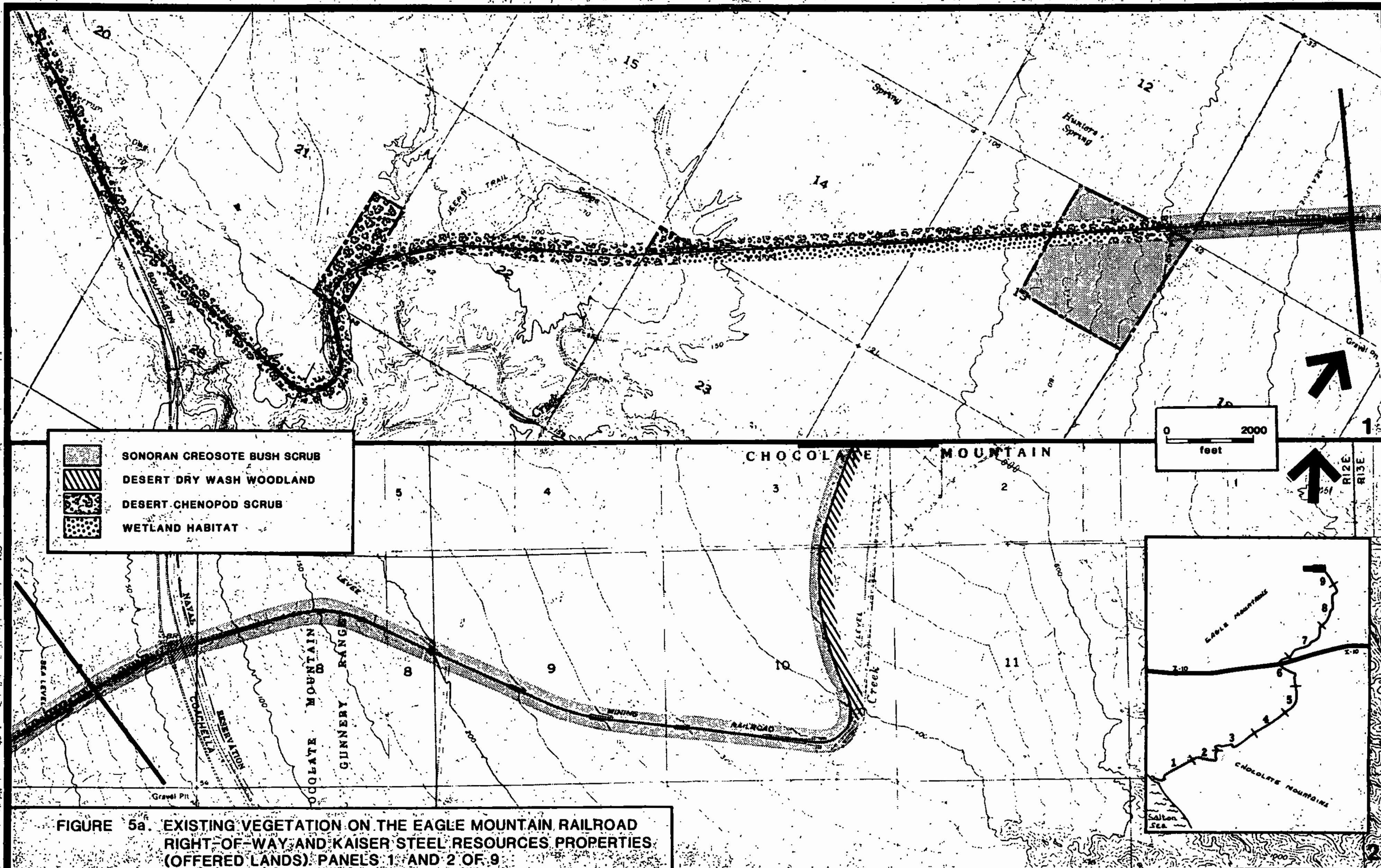


FIGURE 5a. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS). PANELS 1 AND 2 OF 9

R-2100B 12/89

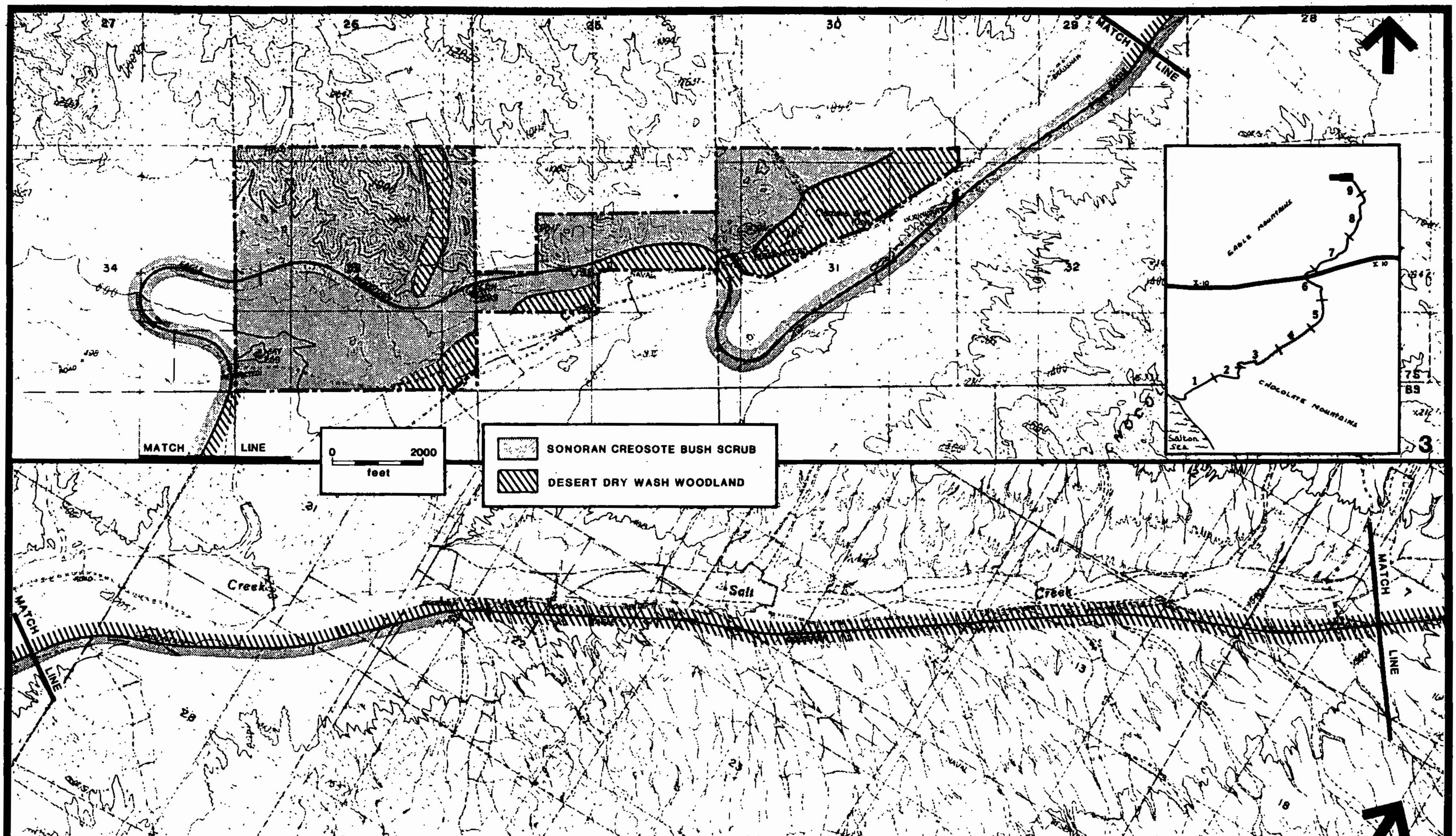


FIGURE 5b. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS). PANELS 3 AND 4 OF 9

R-2100B

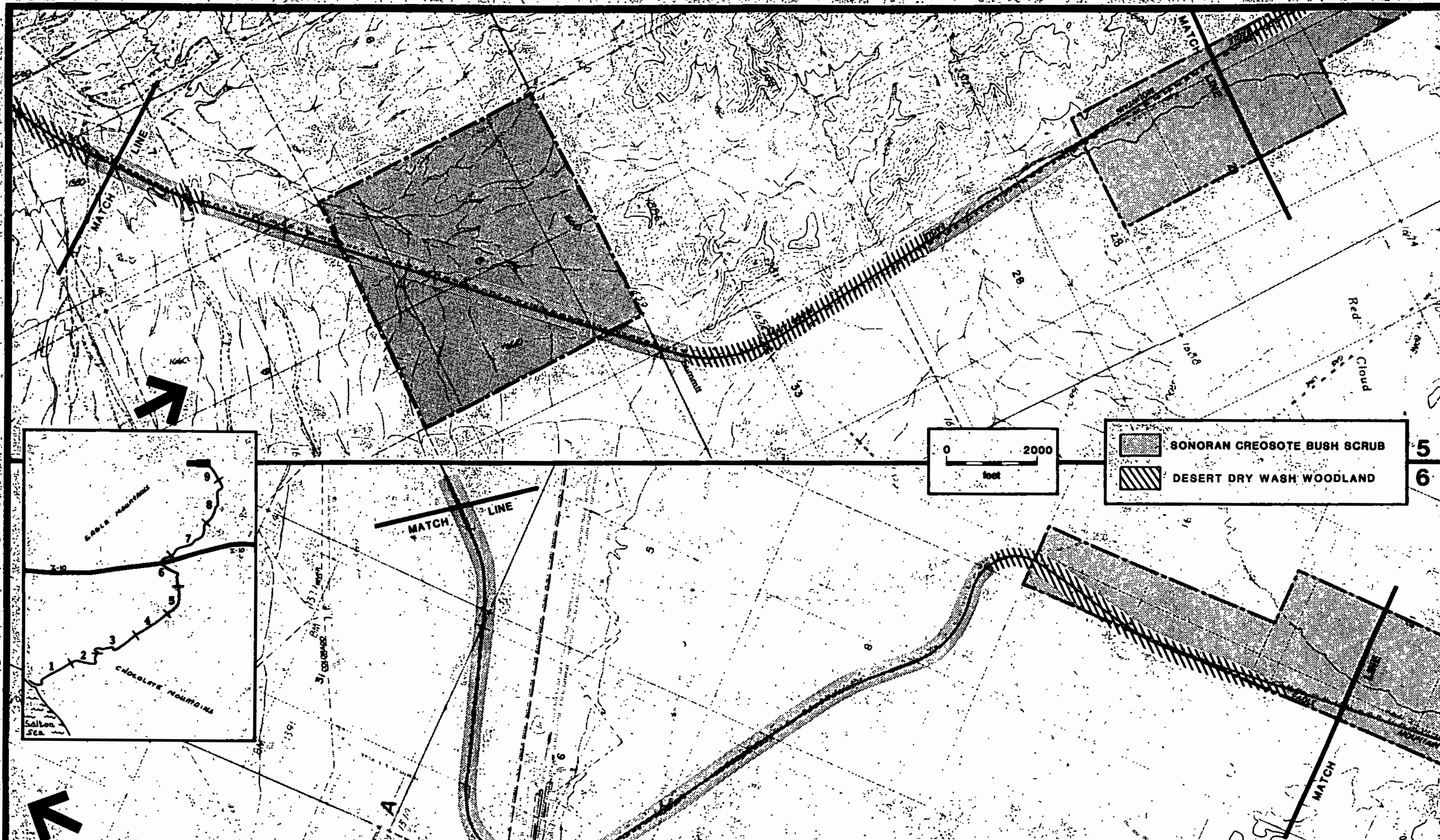


FIGURE 5c. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS): PANELS 5 AND 6 OF 9

R-21008 12/89

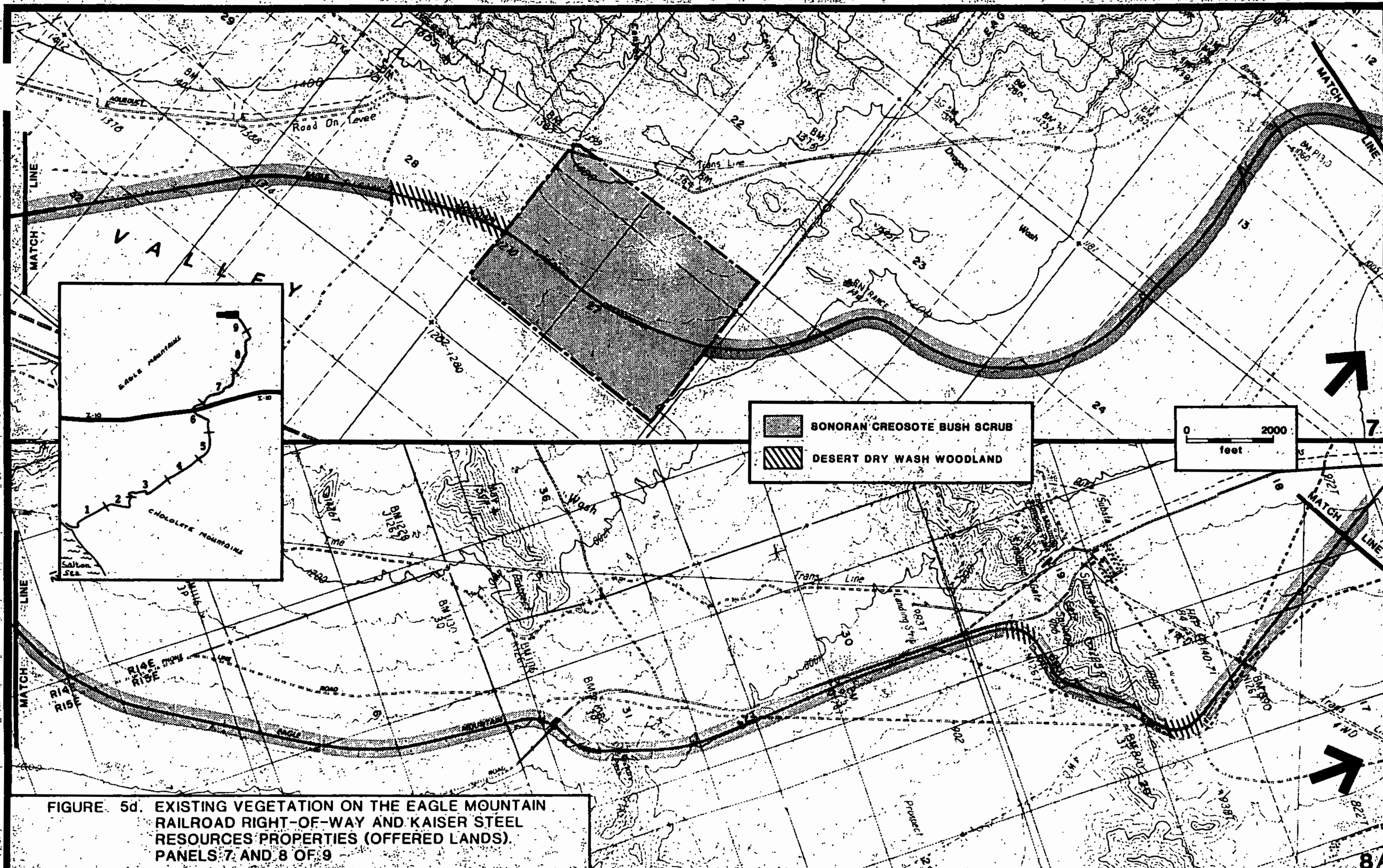


FIGURE 5d. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS). PANELS 7 AND 8 OF 9

R-2100B 12/89

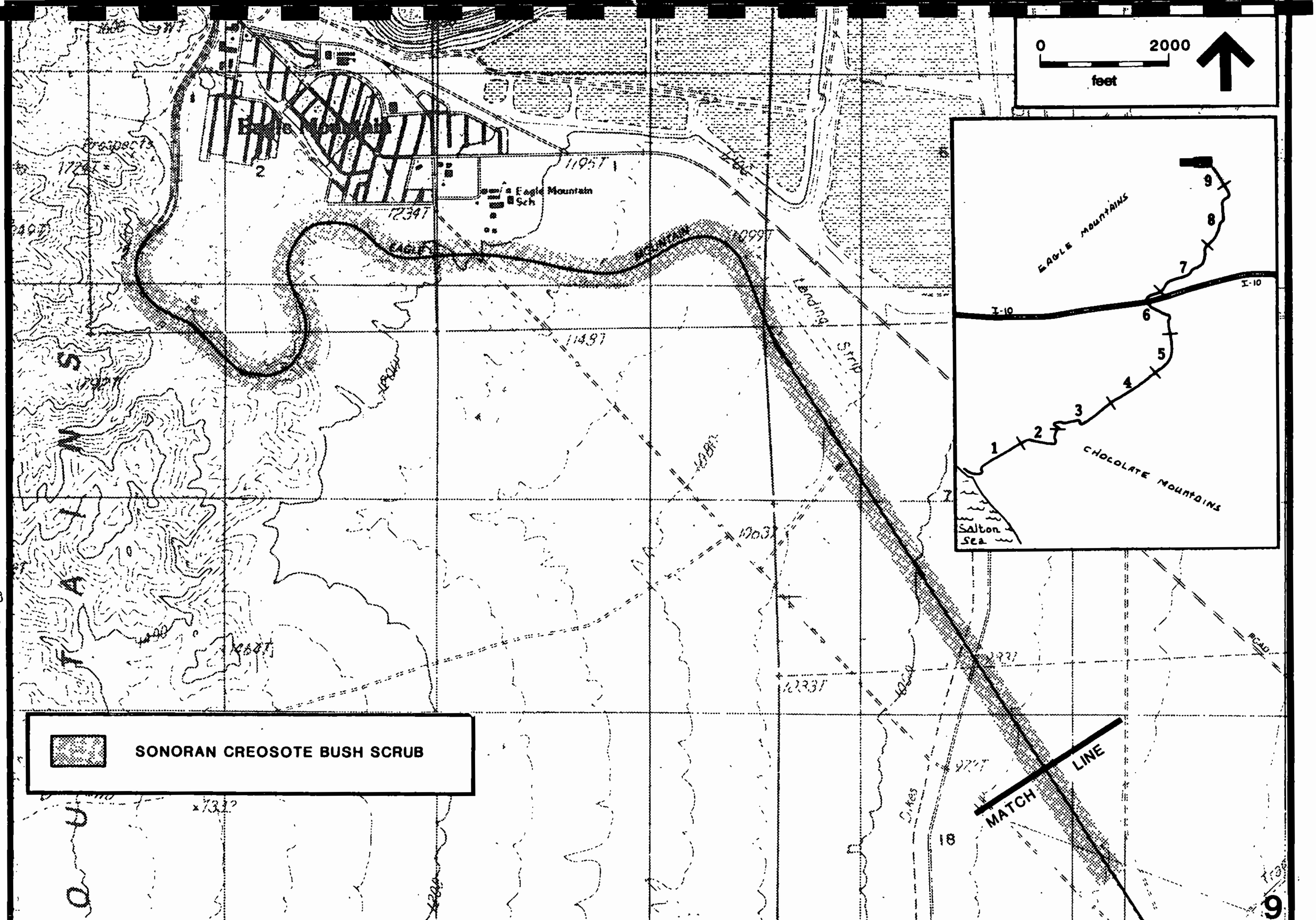


FIGURE 5e. EXISTING VEGETATION ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY, PANEL 9 OF 9

TABLE 2
VASCULAR PLANT LIST

Scientific Name	Common Name	Habitat	Status
Acacia greggii	Catclaw	Washes, canyons	N
Agave deserti Engelm.	Desert agave	Washes, rocky slopes	N
Allenrolfea occidentalis (Wats.) Kuntze.	Iodine bush	Alkaline sink	N
Ambrosia dumosa (Gray) Payne.	Bur-sage	Rocky slopes, flats, etc.	N
Asclepias albicans Wats.	White-stemmed milkweed	Rocky slopes	N
Asclepias subulata Dcne. in A.DC.	Rush milkweed	Washes, sandy areas	N
Atriplex canescens Nutt.	Shadscale	CD/CSS/CMC/G	N
Atriplex elegans (Moq.) D. Dietr. ssp. *fasciculata*	Wheelscale	Saline, alkaline areas	N
Atriplex hymenelytra (Torr.) Wats.	Desert-holly	Alkaline slopes, washes	N
Atriplex polycarpa (Torr.) Wats.	Allscale	Alkaline soils	N
Baccharis emoryi Gray	Emoryi baccharis	Wet places, washes	N
Baccharis sarothroides Gray	Chaparral broom	Sandy washes	N
Bebbia juncea (Benth.) Greene.	Sweet bush	Gravelly fans, washes	N
Brandegea bigelovii (Wats.) Cogn.	Brandegea	Washes, canyons	N
Brickellia incana Gray.	Wooly brickellia	Sandy washes, flats	N
Bromus rubens L.	Foxtail chess	Waste areas, roads, etc.	I
Camissonia boothii ssp. *desertorum* (Munz) Raven.	Woody bottle-washer	Open places	N
Castela emoryi (Gray) Moran & Felger.	Crucifixion thorn	Gravelly places	3-1-1
Cercidium floridum Benth.	Palo verde	Washes, low sandy areas	N
Chilopsis linearis (Cav.) Sweet.	Desert willow	Washes, watercourses	N
Chorizanthe rigida (Torr.) T. & G.	Rigid spiny-herb	Open stony places	N
Chrysothamnus paniculatus (Gray) Hall.	Rabbit-brush	Rocky, open places	N
Coldenia plicata (Torr.) Cov.	Plicate coldenia	Sandy places	N
Condalia sp.		Slopes, canyons	N
Coryphantha vivipara (Nutt.) Britton & Rose var. *alversonii* (Coulter) L. Benson.	Foxtail cactus	Stony slopes	3-2-2
Cryptantha sp.		Sandy flats	N
Cucurbita palmata Wats.	Palmate-leaved gourd	Sandy places	N

TABLE 2
VASCULAR PLANT LIST
(continued)

Scientific Name	Common Name	Habitat	Status
Dalea emoryi Gray.	Emory dalea	Dry, open places	N
Dalea mollissima (Rydb.) Munz.		Rocky flats	N
Dalea parryi (T&G)		Rocky and sandy flats	N
Dalea spinosa Gray	Smoke tree	Sandy washes	N
Datura meteloides A. DC	Jimson weed	Sandy and gravelly slopes	N
Distichlis spicata (L.) Greene var. *stricta* (Torr.) Beetle	Saltgrass	Alkaline soils	N
Ditaxis serrata (Torr.) Heller	Serrate ditaxis	Rocky places	N
Ditaxis neomexicana (Muell.-Arg.) Heller.	Common ditaxis	Dry slopes	N
Echinocactus polycephalus Engelm. & Bigel.	Nigger-heads cactus	Rocky slopes	N
Echinocereus engelmannii (Parry) Lem. var. *engelmannii*	Hedgehog cactus	Gravelly slopes, flats	N
Encelia farinosa Gray ex Torr.	Brittle-bush	Rocky slopes, flats	N
Ephedra californica Wats.	California ephedra	Dry slopes, flats	N
Ephedra nevadensis Wats.	Nevada joint-fir	Dry slopes, hills	N
Eriogonum inflatum Torr. & Frem.	Desert trumpet	Washes and mesas	N
Eriogonum deflexum Torr. ssp. *deflexum*	Skeletonweed	Washes and slopes	N
Euphorbia micromera Boiss.	Sonoran sand-mat	Sandy places	N
Euphorbia polycarpa Benth. var. *hirtella* Boiss.	Small seeded sand-mat	Dry slopes, washes	N
Ferocactus acanthodes (Lem.) Britton & Rose var. *acanthodes*	Barrel cactus	Rocky slopes, fans	?-3-2
Fouquieria splendens Engelm.	Ocotillo	Dry, rocky places	N
Galium angustifolium Nutt. ssp. *gracillimum* Demp. & Steb.	Narrow-leaf bedstraw	Rocky places	N
Haplopappus acradenius (Greene) Blake ssp. *eremophilus* (Greene) Hall.	Alkali goldenbush	Alkaline soils	N
Haplopappus gooddingii (A. Nels.) M. & J.	Spiny goldenbush	Rocky places	N
Hibiscus denudatus Benth.	Rose-mallow	Rocky slopes and canyons	N
Hilaria rigida (Thurb.) Benth. ex Scribn.	Galleta grass	Sandy places	N
Hymenoclea salsola (T. & G.) var. *salsola*	Cheese-bush	Sandy washes, flats	N
Hyptis emoryi Torr.	Desert-lavender	Washes, canyons	N
Isomeris arborea Nutt.	Bladderpod	CSS/CD	N
Juncus xiphioides E. Mey.	Iris-leaved rush	Wet places	N

TABLE 2
VASCULAR PLANT LIST
(continued)

Scientific Name	Common Name	Habitat	Status
Krameria grayi Rose & Painter.	White ratany	Dry sandy, rocky areas	N
Krameria parvifolia Benth. var. *imparata*	Little-leaved ratany	Dry sandy, rocky areas	N
Larrea tridentata (Sesse & Moc. ex DC.) Cov.	Creosote bush	Dry slopes, plains	N
Lycium sp.	Box-thorn	Washes and slopes	N
Mammillaria microcarpa Engelm.	Graham nipple cactus	Rocky slopes	N
Nicotiana trigonophylla Dunal in A. DC.	Desert tobacco	Rocky areas	N
Nolina bigelovii (Torr.) Wats.	Nolina	Dry slopes	N
Notholaena parryi D. C. Eat.	Parry cloak fern	Rocky slopes	N
Olneya tesota Gray.	Desert-ironwood	Washes	N
Opuntia basilaris Engelm. & Bigel. var. *basilaris*	Beavertail cactus	Dry benches, fans	N
Opuntia echinocarpa Engelm. & Bigel. var. *echinocarpa*	Golden cholla	Dry mesas, flats	N
Opuntia ramosissima Engelm.	Pencil cactus	Dry slopes, mesas	N
Palafoxia linearis (Cav.) Lag. var. *linearis*	Spanish needles	Sandy places	N
Pectis papposa Harv. & Gray ex Gray.	Chinch weed	Washes, flats	N
Petalonyx thurberi G. ssp. *thurberi*	Sandpaper plant	Sandy, gravelly areas	N
Phoradendron californicum Nutt.	Mistletoe	Parasite on desert trees	N
Phragmites australis (Cav.) Trinius ex Steudel.	Common reed	Wet places	N
Physalis crassifolia Benth. var. *crassifolia*	Ground-cherry	Sandy and rocky areas	N
Plantago sp.	Plantain	Mesas and flats	N
Pleurocoronis pluriseta (Gray) King & Robinson.	Arrow leaf	Rocky places	N
Pluchea sericea (Nutt.) Cov.	Arrowweed	Wet places	N
Proboscidea althaeifolia (Benth.) Dcne.	Unicorn-plant	Sandy places	N
Prosopis glandulosa Torr. var. *torreyana* (L. Benson) M. C. Jtn.	Mesquite	Washes, low places	N
Prosopis pubescens Benth.	Screw-bean mesquite	Washes and canyons	N
Psathryotes rammosissima (Torr.) Gray.	Velvet rosette	Hard, dry soils, flats	N
Salsola iberica Sennen & Pau.	Russian thistle	Disturbed areas	I
Salvia columbariae Benth.	Chia	Mesas and flats	N
Salvia greatai Bdg.	Orocopia sage	Dry washes and fans	2-1-3
Sarcostemma hirtellum (Gray) R. Holm.	Rambling milkvine	Washes	N
Simmondsia chinensis (Link.) C.K. Schneid.	Goatnut or jojoba	Dry slopes and flats	N

TABLE 2
VASCULAR PLANT LIST
(continued)

Scientific Name	Common Name	Habitat	Status
Sphaeralcea sp.	Globemallow	Rocky slopes, canyons	N
Stephanomeria pauciflora (Torr.) Nutt.	Desert straw	Washes, flats	N
Suaeda torreyana Wats.	Torrey sea-blite	Alkaline areas	N
Tamarix sp.	Tamarisk	Washes, wet places	I
Typha sp.	Cattail	Wet places	N
Washingtonia robusta	Fan palm	Introduced, wet areas	N
Yucca schidigera Roezl ex Ortgies	Mohave yucca	Sandy flats	N

OTHER TERMS

N = Native to locality
I = Introduced species from outside locality
1-2-3 = Rare species CNPS code

Two topographic features within the area mapped as creosote bush scrub have variations in the density and dominance of species. These are the steep rocky slopes of the desert mountains in the project area, and sites where a desert pavement has formed. The steep rocky slopes of the Eagle Mountains, Orocopia Mountains, and Chocolate Mountains have lower densities of the common elements of the creosote bush scrub as the terrain becomes steeper and rockier. Desert pavement areas lack sufficient soil to support a high diversity of plant species.

2. Desert Dry Wash Woodland

The many washes and drainages dissecting the bajadas on the alluvial fans typically support a variety of desert tree species. Larger washes, and washes at the bottoms of bajadas, have larger individuals of trees and greater species diversity than the smaller drainages on the upper bajadas. The Salt Creek area of the Eagle Mountain railway is a good example of a large wash with abundant tree species.

The most common trees found in the large washes are the smoke tree (*Dalea spinosa*), palo verde (*Cercidium floridum*), and ironwood *(Olneya tesota*). Variation in dominance between these species exists depending upon the size and location of the wash. Smaller washes on the upper bajadas tend to have only palo verde trees, while washes and drainages in the steep mountains often lack trees. Shrub and subshrub species common in the washes and drainages include desert-lavender (*Hyptis emoryii*), sweet bush, cheese-bush, jimson weed (*Datura metaloides*), catclaw, and rush milkweed (*Ascelpias subulata*).

Drainages and washes near the foothills of the steep mountains, and in the mountains surrounding the existing Eagle Mountain Mine, have very few trees, and when they are present the trees are mostly palo verde. These drainages and small washes are dominated by the desert-lavender bush. A common subshrub in these mountain drainages is arrow leaf (*Pleurocoronis pluriseta*), along with rose mallow (*Hibiscus denudatus*) and sweet bush.

The dominant vegetation in washes and drainages changes as the elevation drops below sea level south of the Coachella Canal towards the Salton Sea. The soils in this area become increasingly alkaline, limiting the distribution of the more common wash species. These alkaline drainages and washes are often vegetated with tamarisk scrub. This community is dominated by the tamarisk tree (*Tamarix* sp.). Arrowweed scrub is common in areas between tamarisk groves, and this community type is dominated by shrubs of arrowweed *(Pluchea sericea*). Wet drainages just south of the Coachella Canal have localized areas of cattail (*Typha* sp.) and iris-leaved rush (*Juncus xiphioides*). A few fan palms (*Washingtonia* sp.) have been introduced into these drainages.

Wetland vegetation in alkaline sink areas consists of low-growing perennial plants adapted to tolerate high alkalinities and salt concentrations. The drier margins of these areas are vegetated predominantly with salt grass (*Distichlis spicata*) and various species of saltbush (*Atriplex* spp.). The wetter areas in the lower portions of the sink are either dominated by iodine bush (*Allenrolfea occidentalis*) and Torrey sea-blite (*Suaeda torreyana*) or completely devoid of any vegetation. The bare areas of the sink had a salt crust on the surface of the soil at the time of the survey.

3. Desert Chenopod Scrub

The lower portions of the bajada from just below sea level to the Salton Sea are vegetated with alkali- and salt-tolerant chenopod scrubs. Desert chenopod scrub consists of a gradient of plant communities that coincides with the increasing salinity and alkalinity of the substrate. The plant communities of the chenopod scrub range from Desert saltbush scrub at elevations near sea level to Desert sink scrub in the wet alkaline sink areas below sea level, and then back to Desert saltbush scrub along the last portion of the Eagle Mountain rail line before it joins the Southern Pacific rail line at Highway 111.

Desert saltbush scrub communities within the Chenopod scrub complex are dominated by a variety of saltbush species that include shadscale, wheel-scale (*Atriplex elegans*), desert-holly (*Atriplex hymenelytra*), and allscale (*Atriplex polycarpa*). The Desert sink scrub community of the chenopod scrub complex is dominated by iodine bush and Torrey sea-blite, along with scattered individuals of various saltbush species. This community type occurs in areas of poorly drained soils with high salinity and alkalinity where a salt crust often forms on the surface of the ground. Inclusions of Desert greasewood scrub and Alkali-seep areas are found within the Desert sink scrub community. Desert greasewood scrub is similar in species composition to the desert sink scrub; however, the densities and overall diversity of species is much lower. Alkali-seep areas are dominated by salt grass and other salt-tolerant herbs, and exist where soils are permanently moist.

B. WILDLIFE

Wildlife habitat ranges from steep, rough terrain to gently sloping bajadas and supports a diversity of wildlife species. In the lands surrounding the proposed Eagle Mountain landfill site, steeper rocky areas are relatively undisturbed, while areas along the railroad have been--moderately impacted by roads, off-road-vehicle activity, and camping. Overall, the area is generally high quality Colorado Desert habitat suitable for a wide variety of large, far-ranging species. Microhabitats exist for smaller wildlife species and are typical for undisturbed portions of the Colorado Desert. Habitat in the Eagle Mountains is rocky and strewn with large boulder outcrops. Drainages and washes on the project have moderately dense vegetation providing more cover than the more barren slopes of the Eagle Mountains. On the flatter portions of the project site, habitat ranges from almost barren, rocky areas to ocotillo and bur-sage dominated landscapes. These habitats are interspersed with small and large sandy washes. Much of the habitat has large open areas of sand or desert pavement.

Habitat south of the Coachella Canal supports most of the same species found north but differs in having small areas of wetland and alkaline sink habitats. Evidence of small mammals is sparse in these areas, but the amount of cover probably helps to support the same number and species of birds seen throughout the project. Large mammals, including coyote and mule deer, are also present in these areas. These more mesic areas probably support an additional variety of species. For example, waterfowl and wetland-associated mammals were observed while surveying Salt Creek. Zoological nomenclature for birds follows the American Ornithologists' Union Checklist (1982), for mammals, Jones et al. (1982), and for amphibians and reptiles, Jennings (1983).

On the proposed landfill site (including private and public selected lands), 4 reptile species, 12 mammal species, and 24 bird species (Table 3) were observed or detected by sign during field surveys. Reptiles most commonly observed were side-blotched lizard (*Uta stansburiana*) and long-tailed brush lizard (*Urosaurus graciosus*). Commonly observed or detected mammals were Nelson's bighorn sheep, black-tailed hare (*Lepus californicus*), and coyote (*Canis latrans*). Common birds in the undisturbed portions of the Eagle Mountain Mine site include rock wren (*Salpinctes obsoletus obsoletus*), verdin (*Auriparus flaveceps acaciarum*), black-throated sparrow (*Aimophila bilineata deserticola*), and white-crowned sparrow (*Zonotrichia leucophrys*). The disturbed portions of the Eagle Mountain site support fewer numbers of wildlife species. Those species observed are usually associated with disturbed areas and included the house finch (*Carpodacus mexicanus frontalis*) and the introduced house sparrow (*Passer domesticus*).

Habitat along the proposed Eagle Mountain Road extension is similar to habitat found on the flatter portions of the Eagle Mountain landfill site, and species diversity does not differ appreciably. The Eagle Mountain railroad traverses through several microhabitats which resulted in the observation of additional wildlife species. The Kaiser Steel Resources properties and proposed open space parcel also offer varied microhabitats. Most of the species observed were the same as those on the Eagle Mountain landfill site (see Table 3). A total of 7 reptile species, 10 mammal species, and 29 bird species were identified during the survey. Species commonly seen included western whiptail (*Cnemidophorus tigris*), side-blotched lizard, black-tailed hare, desert woodrat (*Neotoma lepida*), kangaroo rat species (*Dipodomys* spp.), Gambel's quail (*Callipepla gambelii*), verdin, rock wren, ruby-crowned kinglet (*Regulus calendula*), and black-throated sparrow. Habitat in washes and drainages supports the same species at increased densities. Wetland habitat within the railroad corridor is too small to support many vertebrate species. The Coachella Canal supports a few nonnative fish species.

Live-trapping near the Eagle Mountain railroad resulted in capture of three individuals of the common small mammal, Merriam's kangaroo rat (*Dipodomys merriami*). Live-trapping on one of the offered Kaiser Steel Resources parcels resulted in seven individuals of four species captured in a relatively small grid (4,000 square meters). Species captured were Merriam's kangaroo rat, desert pocket mouse (*Perognathus penicillatus*), canyon mouse (*Peromyscus crinitus*), and southern grasshopper mouse (*Onychomys torridus*).

C. BIOLOGICAL RESOURCES OF SPECIAL CONCERN

Significant biological resources which may be affected by the implementation of the landfill project are described below. Sensitivity ratings are based on established ratings used by USFWS in the Federal Register, ratings used by CDFG as established in the California Fish and Game Code, and, for plants, ratings used by CNPS. Federal and state endangered and threatened species are those species listed under the respective Endangered Species Acts as being in danger of becoming extinct. Federal candidate species are ranked in the following way: Category 1 species are those species for which the agencies have sufficient biological information to support a proposal for listing as endangered or threatened; Category 2 candidate species are those species where the extent of the threat and/or distribution data are not sufficient to warrant federal listing at this time; and Category C3c candidates are species which were

TABLE 3
WILDLIFE SPECIES OBSERVED

Common Name	Scientific Name	Habitat	Status
Reptiles and Amphibians			
Desert tortoise*	*Gopherus aggassizi*	CDS	FT, CT, BSS
Horned lizard+	*Phyrnosama* spp.	CDS	
Side-blotched lizard*	*Uta stansburiana*	CDS	
Long-tailed brush lizard*	*Urosaurus graciosus*	CDS	
Desert iguana	*Dipsosaurus dorsalis*	DS	
Western whiptail*	*Cnemidophorus tigris*	CDS	
Red racer+	*Coluber constrictor*	CDS	
Mammals			
California leaf-nosed bat	*Macrotis*	C,U	
Western pipistrel	*Pipistrellus hesperus*	F	
Racoon+	*Procyon lotor*	FM	
Ringtail	*Bassariscus astutus*	C	CFP
American badger+	*Taxidea taxus*	CDS	S
Striped skunk-	*Mephitis mephitis*	CDS	
Coyote*	*Canis latrans*	CDS	
Desert kit fox*	*Vulpes macrotis*	CDS	
Bobcat+	*Lynx rufus*	CDS	
Valley pocket gopher+	*Thomomys bottae*	CDS	
Merriams kangaroo rat+	*Dipodomys merriami*	CDS	
Desert woodrat*	*Neotoma lepida*	CDS	
Desert pocket mouse+	*Perognathus penicillatus*	CDS	
Canyon mouse+	*Peromyscus crinitus*	CDS	
Southern grasshopper mouse+	*Onychomys torridus*	CDS	
Blacktail hare*	*Lepus californicus*	CDS	
Cottontail rabbit-	*Sylvilagus auduboni*	CDS	
Mule deer*	*Odocoileus hemionus*	CDS	
Nelson's bighorn sheep*	*Ovis canadensis nelsoni*	CDS	CFP, BSS
White-tailed antelope squirrel*	*Ammospermophilus leucarus*	CDS	

TABLE 3
WILDLIFE SPECIES OBSERVED
(continued)

Common Name	Scientific Name	Habitat	Status
<u>Birds</u>			
Black-necked stilt+	*Himantopus mexicanos*	FM	
Northern harrier+	*Circus cyaneus hudsonius*	CDS	S
Red-tailed hawk*	*Buteo jamaicensis*	CDS	
American kestrel*	*Falco sparverius*	CDS+,U-	
California quail-	*Callipepla californica*	CDS	
Gambel's quail*	*Callipepla gambelii gambelii*	CDS+,U-	
Mourning dove+	*Zenaida macroura*	CDS	
Greater roadrunner+	*Geococcyx californianus*	CDS	
Great horned owl-	*Bubo virginianus*	O-	
Lesser nighthawk	*Chordeiles acutipennis*	U	
Poor-will+	*Phalaenoptilus nuttallii*	CDS	
White-throated swift-	*Aeronautes saxatalis*	F	
Anna's hummingbird-	*Archilochus anna*	U	
Ladder-backed woodpecker*	*Dendrocopos scalaris*	CDS	
Common flicker+	*Colaptes auratus*	CDS	
Black phoebe+	*Sayornis nigricans*	CDS	
Say's phoebe+	*Sayornis saya*	CDS	
Horned lark*	*Eremophila alpestris*	CDS+,U-	
Violet-green swallow+	*Tachycineta thalassina*	Ag,U	
Common raven+	*Corvus corax clarionensis*	CDS	
Loggerhead shrike*	*Lanius ludovicianus*	U	
Verdin*	*Auriparus flaviceps*	CDS	
Cactus wren+	*Campylorhynchus brunneicapillus*	CDS	
Rock wren*	*Salpinctes obsoletus*	CDS	
Thrasher spp.-	*Toxostoma* sp.	CDS	
Western bluebird+	*Sialia mexicana occidentalis*	CDS	
American robin-	*Turdus migratorius*	U	
Ruby-crowned kinglet*	*Regulus calendula*	CDS+,U-	
Blue-gray gnatcatcher-	*Polioptila caerulea*	CDS	
Black-tailed gnatcatcher+	*Polioptila melanura*	CDS	S
Phainopepla+	*Phainopepla nitens*	CDS	

TABLE 3
WILDLIFE SPECIES OBSERVED
(continued)

Common Name	Scientific Name	Habitat	Status
Lesser goldfinch+	*Carduelis psaltria*	CDS	
House finch*	*Carpodacus mexicanus*	U	
Yellow warbler	*Dendroica coronata*	U	
Yellow-rumped warbler+	*Dendroica coronata*	CDS	
Black-throated sparrow*	*Aimophila bilineata*	CDS	
Sage sparrow+	*Aimophila belli*	CDS	
White-crowned sparrow*	*Zonotrichia leucophrys*	CDS	
Dark-eyed junco*	*Junco hyemalis*	CDS	
Western meadowlark-	*Sturnella neglecta*	CDS	
<u>Introduced Species</u>			
House sparrow-	*Passer domesticus*	U	

<u>Habitats</u>

Ag = Agriculture
CDS = Colorado desert scrub
F = Flying overhead
FM = Freshwater marsh
O = Open places, waste places, roadsides, burns, etc.
U = Urban
C = Mine tunnel

<u>Status</u>

S = California species of special concern
CFP = California fully protected
CT = California threatened
FE = Federally endangered
FT = Federally threatened
BSS = Federal Bureau of Land Management sensitive species

+ Railroad, kaiser parcel surveys, and Eagle Mountain Road
- Eagle Mountain Mine surveys
* Both of the above

once considered higher-category candidates, but which have now been found to be too widespread and/or not threatened at this time. BLM sensitive species corresponded with all federal listed and federal candidate species. California fully protected species are those determined by the California Fish and Game Commission to warrant protection from harm.

The CNPS ranking system for plants is as follows: List 1B species are plants considered by CNPS as being rare, threatened, or endangered in California and elsewhere; List 2 species are those plants considered by CNPS to be rare, threatened, or endangered in California but which are more common elsewhere; List 3 species are plants on a review list and these species are considered rare enough to warrant listing as List 1 or 2 species, but they lack sufficient information to actually upgrade them at this time; and List 4 species are plants considered by CNPS to be of limited distribution, and this listing denotes species on a watch list to be monitored for any changes in the status of their populations.

1. Plant Species

Sensitive plant species with the potential for occurrence within the proposed Eagle Mountain landfill site including the BLM selected lands, Eagle Mountain railway right-of-way and proposed spur, Eagle Mountain Road right-of-way and extension, and the Kaiser Steel Resources properties offered for exchange or habitat compensation are discussed below. No listed state or federal plant species were observed or are expected within the bounds of the project, and there is no indication of a potential for any plants of this status to occur in the area. This conclusion is based on the results of extensive field surveys and baseline data generated from data searches for known occurrences of plant species in this portion of the desert.

Plant species of special concern observed or with the potential for occurrence in the study area are listed in Table 4. Historic occurrences of some of these species in the vicinity of the project are shown in Figure 6. Plant species within two candidate categories of the Federal Register have the potential for occurrence in the project area. All four list ratings of the CNPS are represented in the plant species of special concern with the potential for occurrence within the project boundaries.

a. Proposed Eagle Mountain Landfill

1) Observed. Alverson's foxtail cactus (*Coryphantha vivipara* var. *alversonii*) is a federal Category 2 candidate species, a BLM sensitive species, and a CNPS List 1B species. This small cactus occurs on stony slopes at elevations between 2,000 and 5,000 feet in the transition zone between the Mojave and Colorado deserts in Riverside County and near Bard, Imperial County. A population also occurs at Pagumpa, in extreme northwestern Arizona. It grows in clumps ranging from a single head to as many as 40 heads. Alverson's foxtail cactus was observed frequently in areas of Eagle Mountain Mine. Large populations of this foxtail cactus occur in the southwest portion of the mine along Eagle Creek, mostly in the washes north of the mining road (about 200 individuals observed), and in the southeast portion of the mine from near the landing strip to north of Kaiser Road and west of Eagle Mountain Road (about 80 individuals observed) (Figure 7). Most of the populations of this species occur on

TABLE 4
PLANT SPECIES OF SPECIAL CONCERN OCCURRING (*) OR WITH THE POTENTIAL TO OCCUR IN THE PROJECT AREA

Scientific Name	Common Name	Habitat	Status§
Astragalus crotalariae		Sandy flats, fans	4
Astragalus insularis Kell. var. *harwoodii* Munz & McBurney	Sand-flat locoweed	Dunes and sandy places	2
Astragalus lentiginosus Dougl. var. *borreganus* Jones	Dapple-pod	Dunes and sandy valleys	4
Cassia covesii Gray	Senna	Dry washes	2
Castela emoryi (Gray) Moran & Felger.*	Crucifixion thorn	Dry gravelly areas	2
Colubrina californica Jtn.	California snake-bush	Dry canyons	4
Coryphantha vivipara (Nutt.) Britton & Rose var. *alversonii* (Coulter) L. Benson*	Alverson's Foxtail cactus	Stony slopes	1B,C2,BSS
Cryptantha costata Bdg.	Ashen forget-me-not	Sandy and gravelly areas	4
Cryptantha holoptera (Gray) Macbr.	Rough-stemmed forget-me-not	Rocky places	4
Cynanchum utahense (Engelm.) Woodson.	Debolita	Dry sandy places	4
Ditaxis californica (Bdg.) Pax & K.Hoffm.	California ditaxis	Washes, rock benches	1B,C2,BSS
Ferocactus acanthodes (Lem.) Britton & Rose var. *acanthodes**	Barrel cactus	Rocky slopes, flats	3,C3c,BSS
Lycium parishii Gray.	Parish thornbush	Dry washes, flats	2
Opuntia munzii C.B. Wolf	Munz cholla	Dry gravelly areas	1B,C2,BSS
Pilostyles thurberi Gray		Stem parasite on *Dalea*	4
Proboscidea althaeifolia (Benth.) Dcne*	Unicorn-plant	Sandy areas	4
Salvia greatai Bdg.*	Orocopia sage	Dry washes and fans	1B,C2,BSS
Xylorhiza cognata (Hall) Cronq. & Keck.	Mecca aster	Gypsum clays	4
Xylorhiza orcuttii (Vasey & Rose) Cronq. & Keck.	Orcutt aster	Gypsum soils	1B,C2,BSS

<u>§Status</u>

- C2 = Threat and/or distribution data are insufficient to support federal listing
- C3c = Federal; too widespread and/or not threatened
- BSS = Bureau of Land Management sensitive species
- 1B = Plants rare, threatened, or endangered in California and elsewhere
- 2 = Plants rare, threatened, or endangered in California but more common elsewhere
- 3 = Plants that CNPS needs more information for - A review list
- 4 = Plants of limited distribution - A watch list

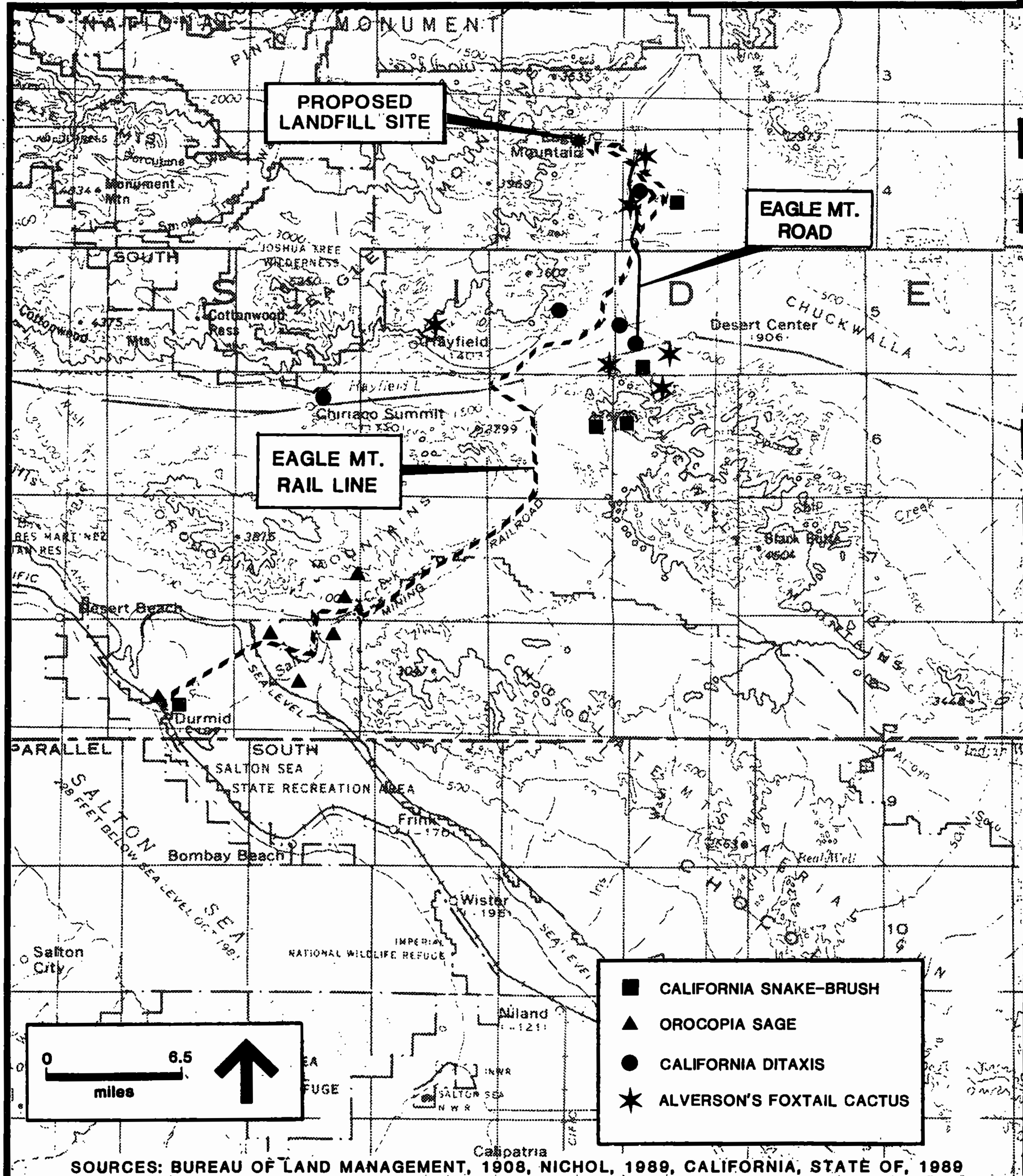


FIGURE 6. HISTORIC RECORDED DISTRIBUTION OF PLANT SPECIES OF SPECIAL CONCERN

RECON

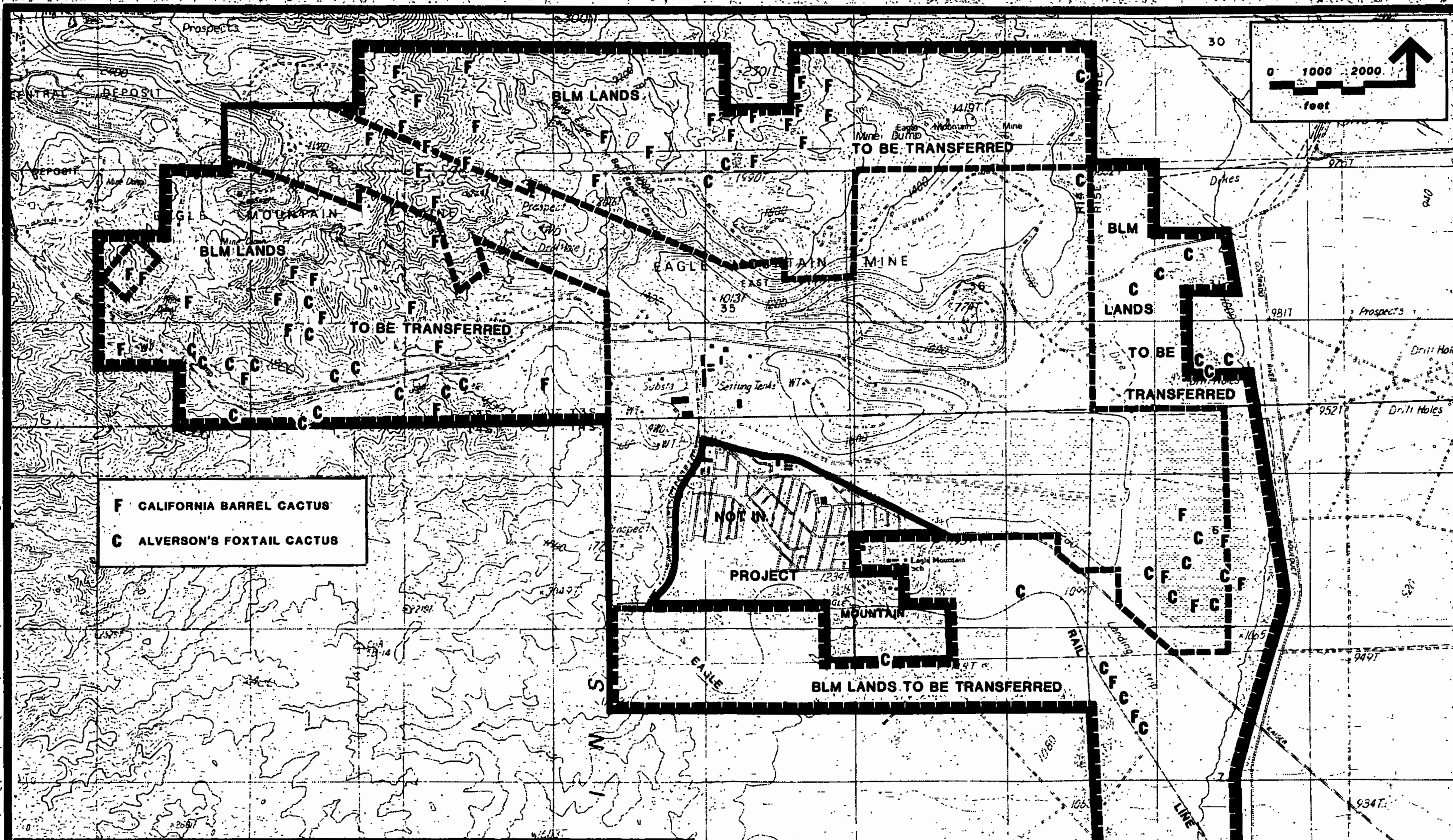


FIGURE 7. LOCATION OF PLANT SPECIES OF SPECIAL CONCERN AT THE PROPOSED EAGLE MOUNTAIN LANDFILL SITE

public (selected) lands on the landfill site because of the less disturbed state of these lands.

California barrel cactus (*Ferocactus acanthodes* var. *acanthodes*) is a BLM sensitive species, occurs on List 3 of the CNPS rating, and was recently down-listed to federal Category C3c. This handsome columnar cactus usually grows as a single stem on steep, rocky slopes and canyon walls as well as gravelly flats at elevations below 2,000 feet. A rather large population of California barrel cactus occurs throughout the undisturbed slopes around the mine and in the fine tailings pond in the southeastern portion of the existing mine (see Figure 7). More than 800 barrel cacti occur within the project boundaries at the proposed landfill site. As was true for Alverson's foxtail cactus, most of the California barrel cactus populations occur on the less disturbed public (selected) lands.

2) Not Observed. California ditaxis (*Ditaxis californica*) is a Category 2 candidate species, a BLM sensitive species, and a CNPS List 1B species. It is a small perennial plant that has known historic occurrences in the area of Eagle Mountain Road and the Eagle Mountain rail line. California ditaxis is a species distinguished from the other species of the genus *Ditaxis* primarily by the lack of pubescence on the foliage (Munz 1974). It has a dual blooming period (March-May and October-December) and it would have been identifiable during the survey period conducted for this project. Two other species of *Ditaxis* (*D. serrata* and *D. neomexicana*) were observed along the railway and Eagle Mountain Road to the south of the mine, and although there are historic occurrences of California ditaxis documented in the vicinity of the Eagle Mountains, it is not anticipated (based on the results of the field surveys) that these populations lie within the proposed project area (Eagle Mountain Mine site, Eagle Mountain Road corridor, or the Eagle Mountain railway corridor).

Orcutt aster (*Xylorhiza orcuttii*) is a federal Category 2 candidate, a BLM sensitive species, and is considered a List 1B species by CNPS. It is a perennial subshrub with showy purple flowers with yellow centers. This species prefers the gypsum soils found in the desert region. It has known historic occurrences in canyons on the southwest side of the Salton Sink, especially west of Imperial County. This distribution is well south of the project area and the lack of gypsum soils in the study area makes the potential for occurrence of this species within the bounds of the entire project low.

Munz cholla (*Opuntia munzii*) is a federal Category 2 candidate, a BLM sensitive species, and a List 1B CNPS plant. It is a large, treelike cholla known to occur in the Chocolate Mountains south of the Chuckwalla Bench to eastern Imperial County in dry gravelly places. This distribution is well south of the study area. This cholla is easily identified by its stature alone. This species would have been observed if within the study area; therefore, the potential for occurrence within the entire study area is low.

California snake-bush (*Colubrina californica*) is considered a List 4 species by CNPS. It is a tall, rather spinescent shrub with the branches covered with a fine grayish pubescence. It has known historic occurrences in the vicinity of the project area. This species would have been easily identified if encountered within the project area; therefore, based on the

1257

results of the surveys, the potential for this species to occur in the entire project area is low.

Mecca aster (*Xylorhiza cognata*) is considered a List 4 species by CNPS. It is a small shrub that has a lavender flower with a yellow center. It grows on gypsum clays and sandstone cliffs in steep canyons. The closest known historic location for this species is in Box Canyon near Mecca (Jaeger 1969) 40 to 50 miles to the west of the study area. The lack of gypsum clays in the mine area makes the potential for occurrence of this species in the study area low.

Pilostyles (*Pilostyles thurberi*) is a very small stem parasite that is found on species of the genus *Dalea,* especially on Emory dalea (*Dalea emoryi*). This species is a CNPS List 4 plant. Only the small brown flowers and associated small bracts are visible on the outside of the host plant, making this species difficult to detect. The absence of the host species at the mine site makes the potential for occurrence of this species in this area of the project low. The host plant for this species does occur along a portion of the Eagle Mountain railway (see discussion of the railway corridor below).

Crucifixion thorn (*Castela emoryi*) is a CNPS List 2 plant. It is easily recognizable by its spiny habit and greenish stems. This species is easily identifiable year-round and, therefore, would have been observed if present at the mine site. This species was observed within the railway corridor (see discussion of Eagle Mountain railroad below).

Unicorn-plant (*Proboscidea althaeifolia*) is a low-growing perennial in sandy places of the desert region. It has distinct woody fruits with long curved horns that make it identifiable long after the plant dies back during the summer. It would have been observed if in the mine area; therefore, the potential for occurrence of this species at the mine site is low. This species was observed within the railway corridor (see discussion below).

Several other annual species of desert plants are listed by CNPS as having the potential for occurrence in the study area. One CNPS List 2 species, the sand-flat locoweed (*Astragalus insularis* var. *hardwoodii*) is potential in the area. CNPS List 4 annual species include locoweed *(Astragalus crotalariae*), dapple-pod (*Astragalus lentiginosus* var. *borreganus*), ashen forget-me-not (*Cryptantha costata*), and rough-stemmed forget-me-not (*Cryptantha holoptera*). These species would have been difficult to identify at the time of the survey since they bloom and set seed during the late winter and spring months (February-May). It is not anticipated that large populations of these species occur at the mine site due to the steepness of the terrain and the very shallow soils on the slopes. Currently, the slopes around the mine support a widely scattered and limited array of perennial shrubs and cacti.

Additional perennial shrubs and herbs occurring on CNPS List 2 and having the potential for occurrence not only in the mine area but also within the entire project study area include senna (*Cassia covesii*), Parish thornbush (*Lycium parishii*), and spear-leaf (*Matela parvifolia*). One CNPS List 4 perennial species, debolita (*Cynanchum utahense*), could also occur in the area. Each of these species would have been easily identified if encountered during the surveys; thus, based on the results of the field visits, the potential for occurrence of large populations of any of these perennial species in the entire study area is low.

b. Eagle Mountain Railroad Right-of-Way. Two federal Category 2 candidate species were observed within the survey corridor of the railroad (Figures 8a-e): Alverson's foxtail cactus and Orocopia sage (*Salvia greatai*). A federal Category 3c plant, California barrel cactus, also occurs along the railway. Two other plant species were observed which appear only on CNPS lists, unicorn-plant and crucifixion thorn.

A few scattered individuals of Alverson's foxtail cactus occur within the 200-foot survey corridor of the railroad. The sightings were of individuals or small groups (less than 10 plants). None were observed along the railroad south of I-10. No large concentrations or populations of this species occur within the survey corridor.

Orocopia sage is a Category 2 candidate species, a BLM sensitive species, and is considered a List 1B plant by CNPS. This sage shrub has distinct spinose margined leaves and grows along dry washes and alluvial fans below 600 feet elevation from the Orocopia Mountains to the Chocolate Mountains in Riverside County. The species has known historic occurrences in the vicinity of the Eagle Mountain railroad line. These locations were verified during the current surveys as several populations of this species were observed along the southern portion of the railway (see Figures 8a and 8b). A significant population of Orocopia sage occurs in the vicinity of the Eagle Mountain railway from just northeast of the trestle crossing over Salt Creek south to the area adjacent to the levee north of the Coachella Canal. No individuals were observed within the boundaries of the survey in the proposed Eagle Mountain landfill area, Eagle Mountain Road extension, or railway north of I-10.

A few widely scattered individuals of California barrel cactus occur in very low numbers within and adjacent to the railway survey corridor. No large concentrations or populations of this species occur within 200 feet of the rail line along the Eagle Mountain railroad.

Fewer than five individuals of crucifixion thorn occur widely scattered along the railway just to the north of the Coachella Canal. A large historic population of this species once occupied the area now inundated by the Hayfields Reservoir (Jaeger 1969).

A small number of individuals of unicorn-plant occur in sandy soils along the surveyed railroad corridor north of I-10 (see Figure 8b). No large populations of this species were observed on the surveys.

c. Eagle Mountain Road Improvements, Road Extension, and Railroad Spur. Scattered individuals of Alverson's foxtail cactus and California barrel cactus occur within the 200-foot survey area along the existing Eagle Mountain Road (Figures 9a-b). No large concentrations or populations of these species were observed along or adjacent to this road. No other sensitive plant species were observed within this survey corridor. The proposed Eagle Mountain Road extension and new railroad spur is shown on Figure 9b. The current alignment of this road extension and rail spur would pass through areas containing Alverson's foxtail cactus and California barrel cactus.

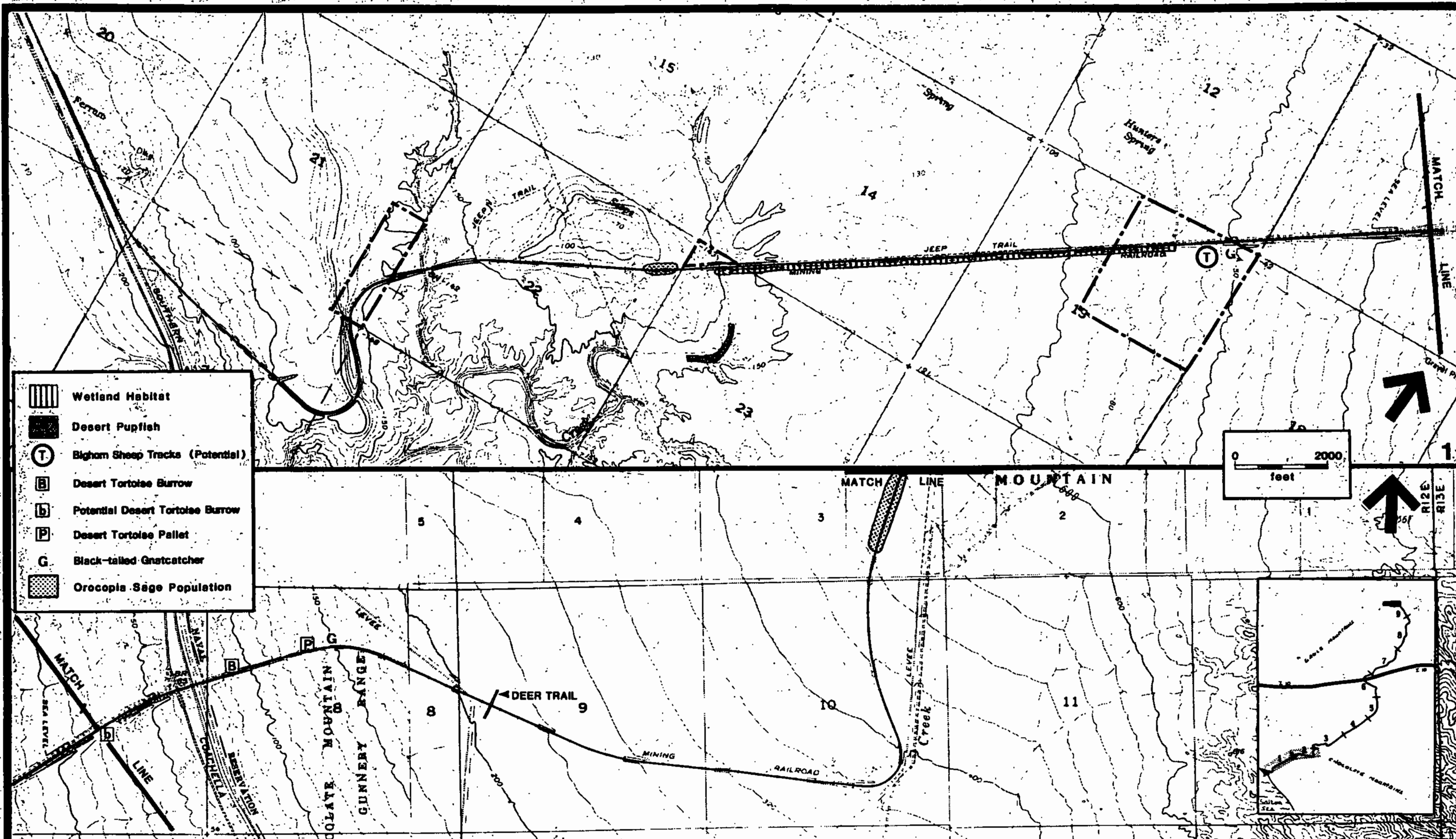


FIGURE 8a. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS): PANELS 1 AND 2 OF 9

R-2100B 12/89

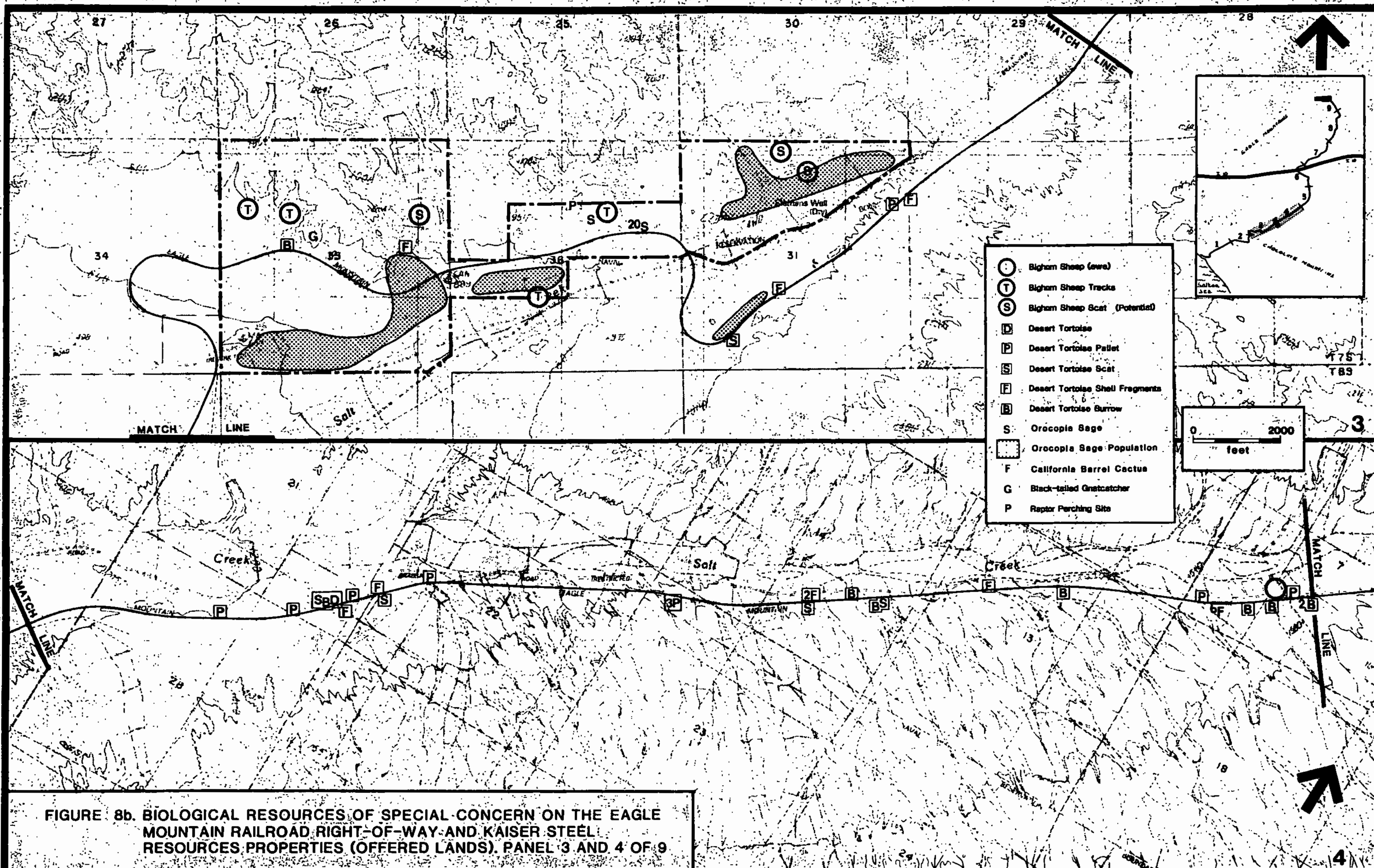


FIGURE 8b. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS). PANEL 3 AND 4 OF 9

R-2100B 12/89

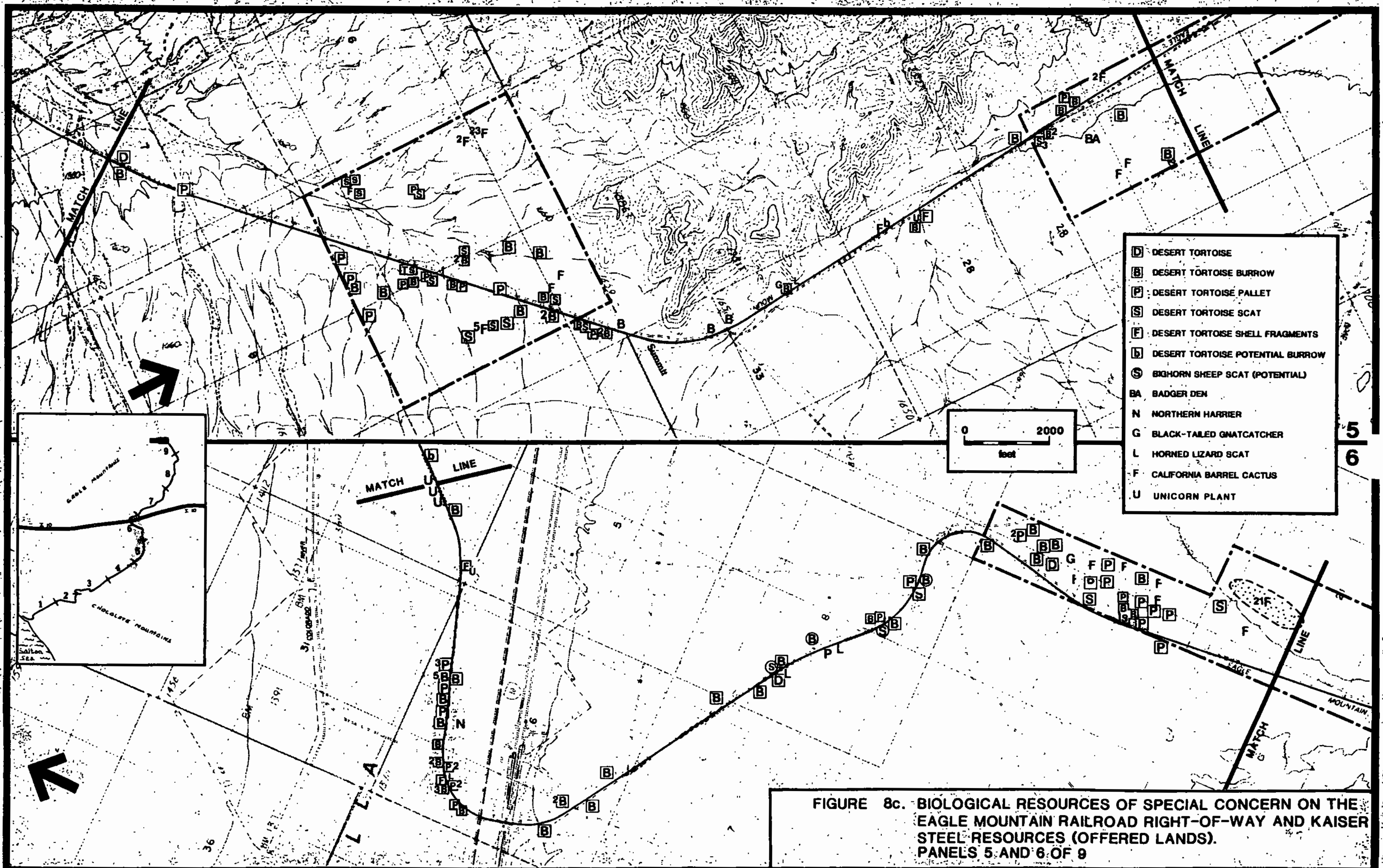


FIGURE 8c. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES (OFFERED LANDS).
PANELS 5 AND 6 OF 9

R-2100B 1/90

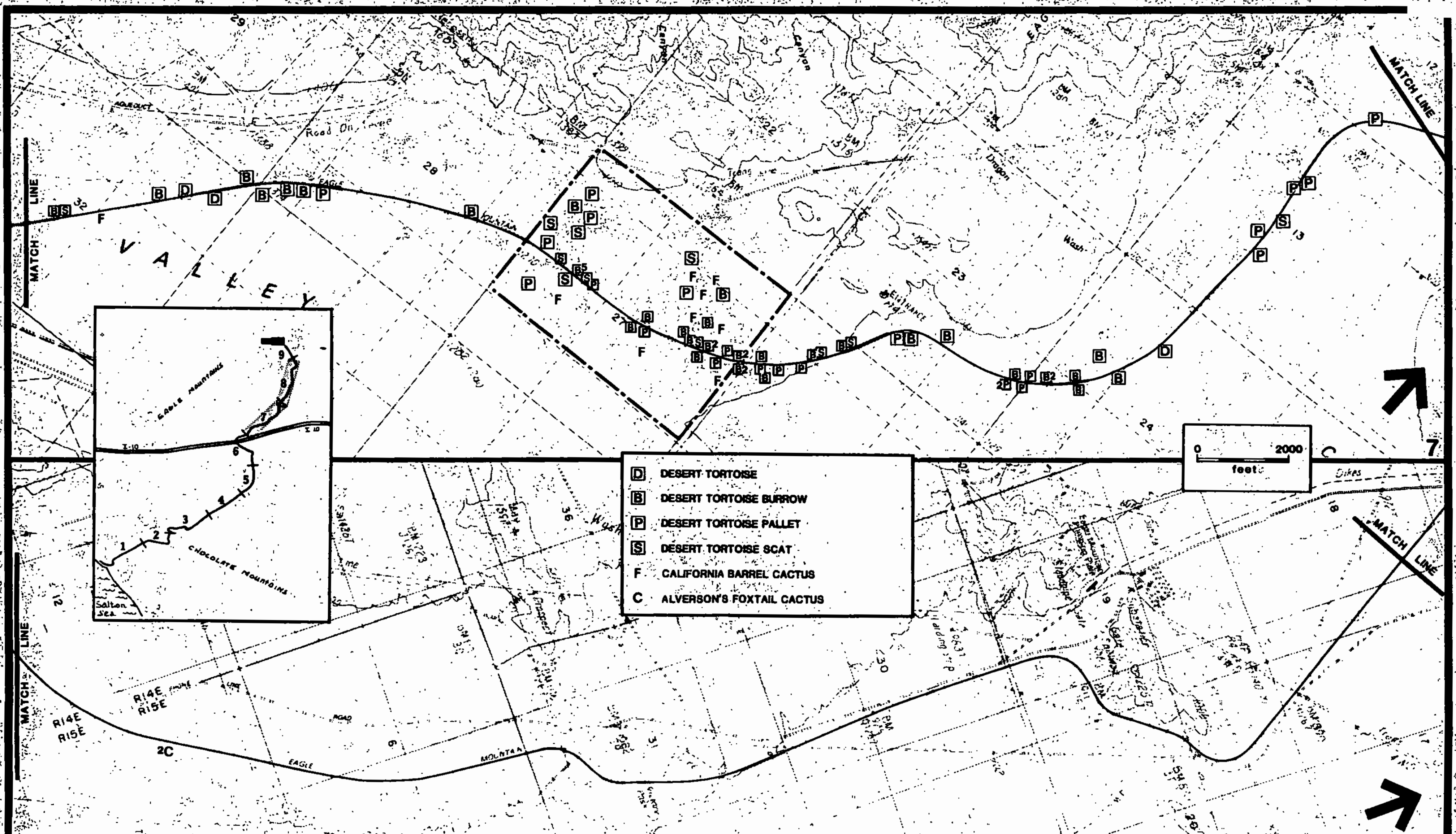


FIGURE 8d. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY AND KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS), PANELS 7 AND 8 OF 9

R-2100B 1/90

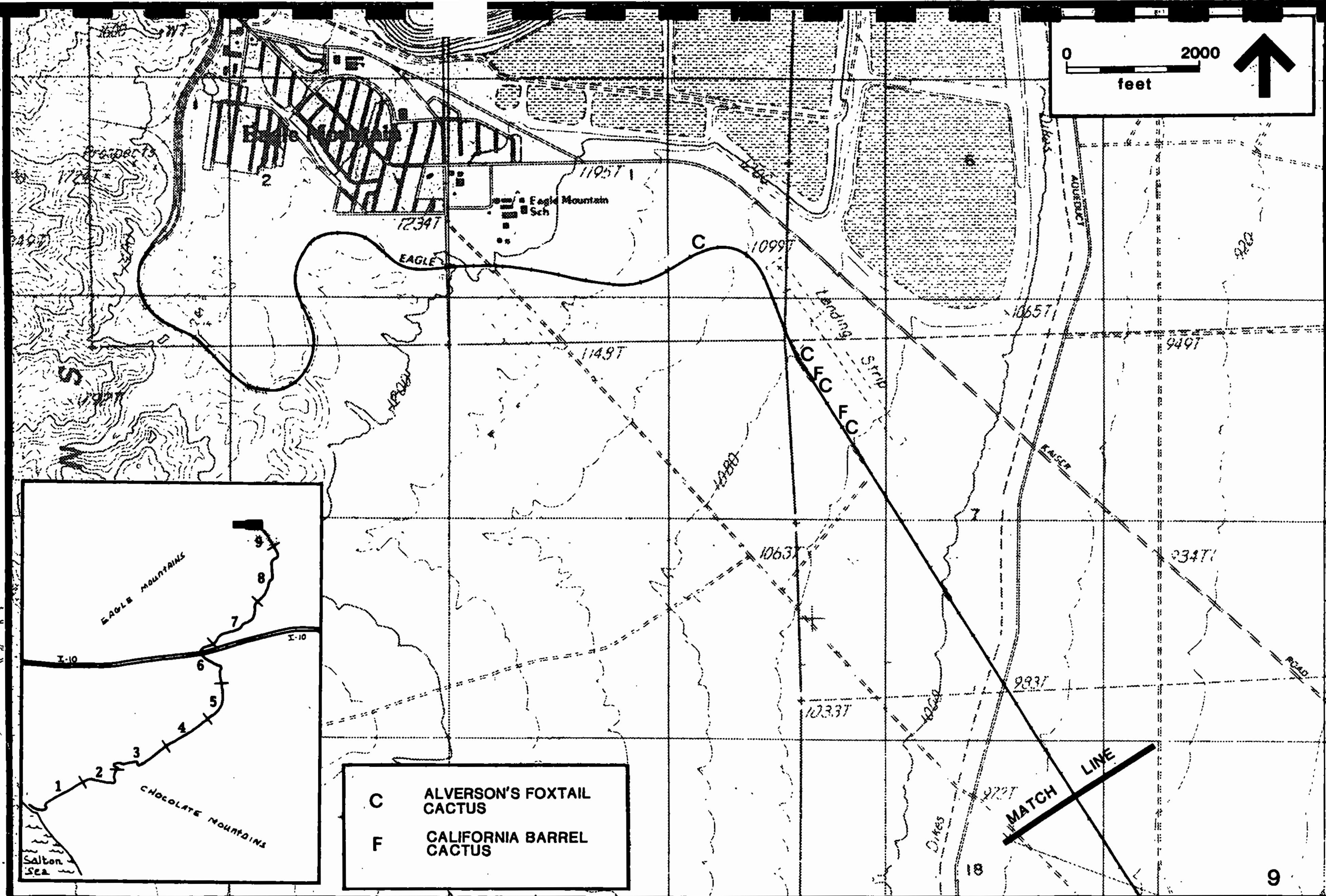


FIGURE 8e. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON THE EAGLE MOUNTAIN RAILROAD RIGHT-OF-WAY, PANEL 9 OF 9

RECON

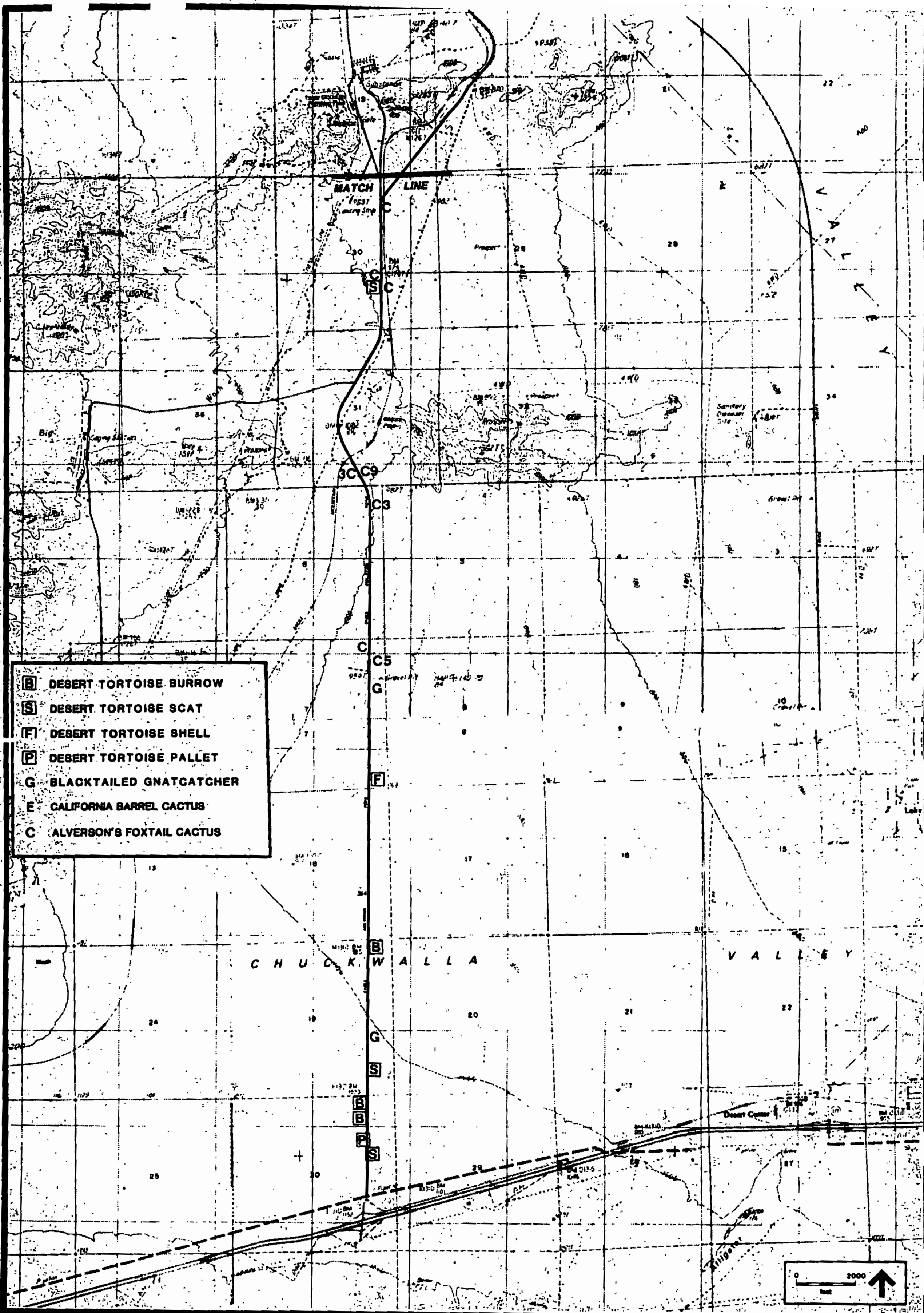


FIGURE 9a. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN ROAD AND SPUR LOCATION MAP 1 OF 2

R-2100 7/90

RECON

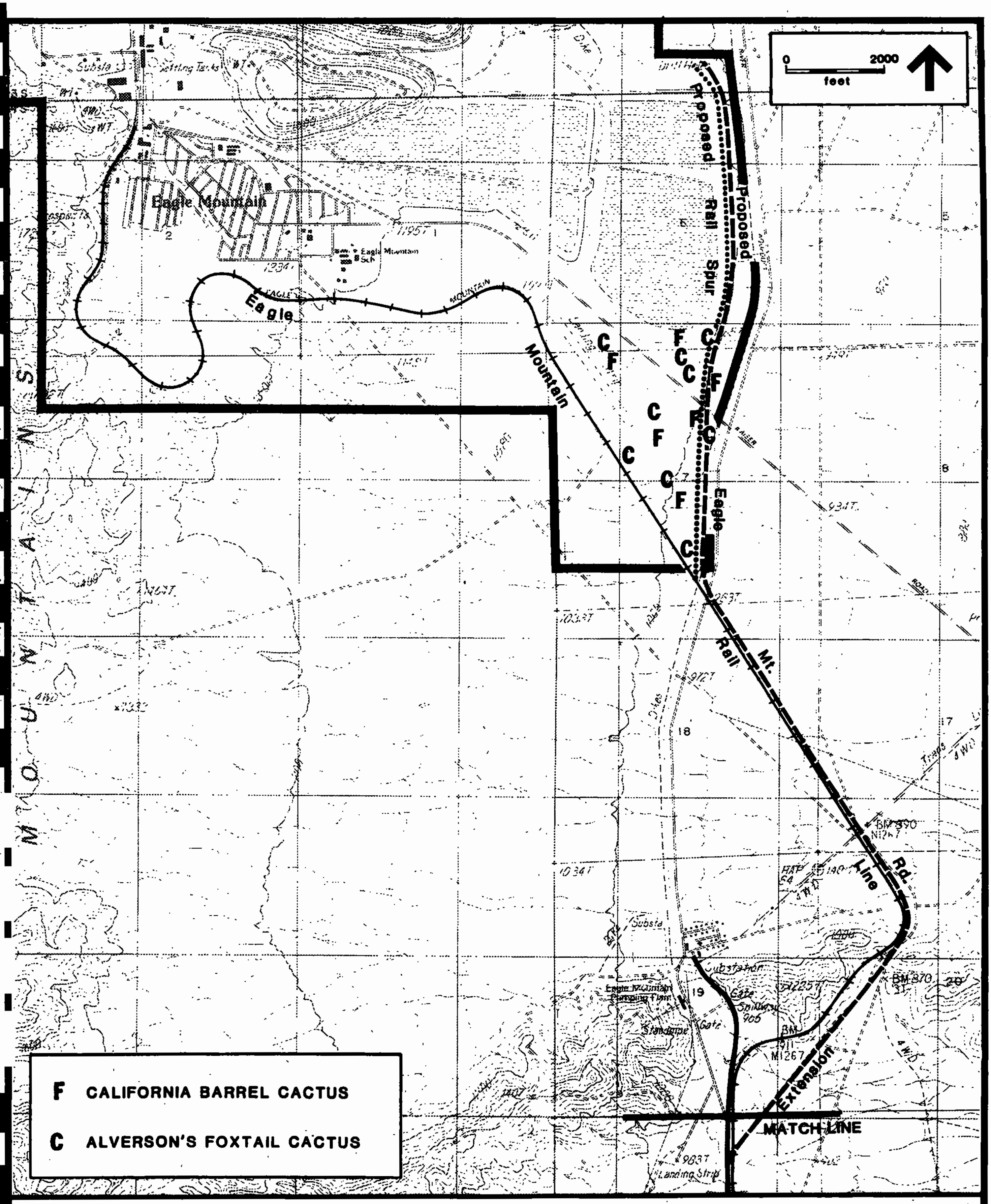


FIGURE 9b. BIOLOGICAL RESOURCES OF SPECIAL CONCERN ON EAGLE MOUNTAIN ROAD EXTENSION AND RAILROAD SPUR
MAP 2 OF 2

RECON

Other sensitive species that have the potential for occurring in the corridor of the Eagle Mountain Road extension are similar to those discussed under the Eagle Mountain Mine section above, especially California ditaxis and California snake-bush. Both of these species have historic occurrences documented in the vicinity of Eagle Mountain Road; however, these plants were not observed within the survey corridor.

d. Kaiser Steel Resources Properties (Offered Lands). Two sensitive plant species were observed on the Kaiser Steel Resources-owned parcels surveyed for this project, Orocopia sage and California barrel cactus. The Section 27 parcel north of I-10 in the Hayfield Spring 7.5-minute U.S.G.S. quadrangle has a few individuals of California barrel cactus within its boundaries (see Figure 8b). A rather large population of Orocopia sage occurs on the parcels covering Sections 31, 35, and 36 of the Red Canyon 7.5-minute U.S.G.S. quadrangle (see Figure 8a). Sensitive plant species with the potential for occurrence on the parcels surveyed include those discussed under the Eagle Mountain Mine site.

2. Wildlife Species

A record search of the NDDB system and distribution literature for the Eagle Mountain Mine area and associated facilities revealed the potential for significant wildlife species to occur in the vicinity of the proposed project (State of California 1989). Thirty-one species of concern, determined by various wildlife agencies to be declining, could occur on the project site and are listed in Table 5. The local distributions of some of these species are shown in Figure 10. Wildlife species of concern, or their sign, observed during the surveys are described below. Species not detected but with the potential to occur on the project site are also discussed.

a. Proposed Eagle Mountain Landfill Site. Significant wildlife observations are shown on Figure 11.

1) Desert Tortoise. The desert tortoise is a federal and State of California threatened species. It ranges from southern Nevada and extreme southwestern Utah through southeastern California and southwestern Arizona into northern Mexico (State of California 1989). In California, the tortoise occurs in northeastern Los Angeles, eastern Kern and southeastern Inyo counties, and most of San Bernardino, Riverside, and Imperial counties. Based upon genetic studies, two major genetic subpopulations have been identified (Jennings 1985, Spang et al. 1988). The dividing line between these subpopulations is the Colorado River. The tortoises east of the Colorado River are referred to as the Sonoran population. Those tortoises west of the Colorado River, including those on the project site, are designated as the Mojave population.

The desert tortoise is considered to be a "K-selected" species, meaning that it has a low birth rate, low recruitment of juveniles into the breeding population, low mortality in older age categories, and a low population turnover rate (Hohman et al. 1980). As a result, the number of adults may remain constant for relatively long periods, during which the ratio of adults to other age groups may vary widely. Next to the number of breeding adults, the number of juveniles likely to join the ranks of adults is a critical component of a stable population. However, assessing the number of juveniles in

TABLE 5
WILDLIFE SPECIES OF SPECIAL CONCERN OCCURRING
OR WITH THE POTENTIAL TO OCCUR
ON THE PROPOSED PROJECT AND ASSOCIATED FACILITIES

Common Name	Scientific Name	Habitat*	Status
<u>Fish</u>			
Desert pupfish+	*Cyprinodon macularius*	Ponds	FE,BSS,CE
<u>Reptiles and Amphibians</u>			
Flat-tailed horned lizard	*Phrynosoma mcalli*	CDS,sandy soils	C1,CCE,BSS
Desert tortoise+	*Gopherus agassizi*	CDS,MDS	FT,CT,BSS
<u>Mammals</u>			
California leaf-nosed bat+	*Macrotus californicus*	Caves, mines	C2,S,BSS
Townsend's big-eared bat+	*Plecotus townsendii*	CDS,mines,buildings	S
Pocketed freetail bat	*Nyctinomo femorosaccus*	CDS,boulders,cliffs	S
Spotted bat	*Eudermos maculatum*	SDS, mines	C2
California mastiff bat	*Eumops perotis*	SDS,C,mines	C2;S
American badger+	*Taxidea taxus*	G,CDS	S
Mountain lion	*Felis concolor*	CDS,mountain ranges	S
Nelson's bighorn sheep+	*Ovis canadensis nelsoni*	CDS,mountain ranges	CFP,BSS
<u>Birds</u>			
Black-shouldered kite	*Elanus caeruleys*	CDS,washes	CFP
Golden eagle	*Aquila chrysaetos canadensis*	CDS	S,CFP,BEPA,BSS
Prairie falcon	*Falco mexicanus*	CDS(ridges)	S
Peregrine falcon	*Falco peregrinus*	CDS, mountain ranges	FE,CE,BSS
Northern harrier+	*Circus cyaneus*	CDS	S
Swainson's hawk	*Buteo swainsoni*	M	C2,CT
Burrowing owl	*Athene cunicularia*	CDS	S

TABLE 5
WILDLIFE SPECIES OF SPECIAL CONCERN OCCURRING
OR WITH THE POTENTIAL TO OCCUR
ON THE PROPOSED PROJECT AND ASSOCIATED FACILITIES
(continued)

Common Name	Scientific Name	Habitat*	Status
Yuma clapper rail	*Rallus longirostris yumaenesis*	FM	FE,BSS,CT
California black rail	*Laterallus jamaicensis coturniculus*	FM	BSS,CT,C1
Long-eared owl	*Asio otus*	CDS,washes	S
Gila woodpecker	*Centurus uropygialis*	M	CE
Purple martin	*Progne subis*	CDS	S
Eagle Mountain scrub jay	*Aphelocoma coerulescens cana*	PJ	C2C
Bendire's thrasher	*Toxostoma bendirei*	CDS	S
LeConte's thrasher	*Toxostoma leconteii*	CDS	S
Crissal thrasher	*Toxostoma crissale*	CDS	S
Virginia's warbler	*Vermivora virginiae*	M	S
Yellow warbler	*Dendroica petechia*	M,washes	S
Yellow-breasted chat	*Icteria virens*	M,washes	S
Black-tailed gnatcatcher+	*Polioptila melanura*	CDS	S

*For detailed habitat requirements, see text.
+Detected during surveys, 1989-1990.

Habitats

CDS = Colorado desert scrub
FM = Freshwater marsh
G = Grassland, pasturelands, etc.
M = Migrant only
MDS = Mojave desert scrub
C = Caves, mine tuneel
PJ = Pinyon/juniper woodland

Status

S = California species of special concern
CFP = California fully protected
CT = California threatened
CE = California endangered
CCE = California candidate endangered
BSS = Federal Bureau of Land Management sensitive species
BEPA = Federal Bald Eagle Protection Act
C1 = Federal Category 1
C2 = Federal Category 2
C2C = Federal Category 2 candidate
FE = Federal endangered
FT = Federal threatened

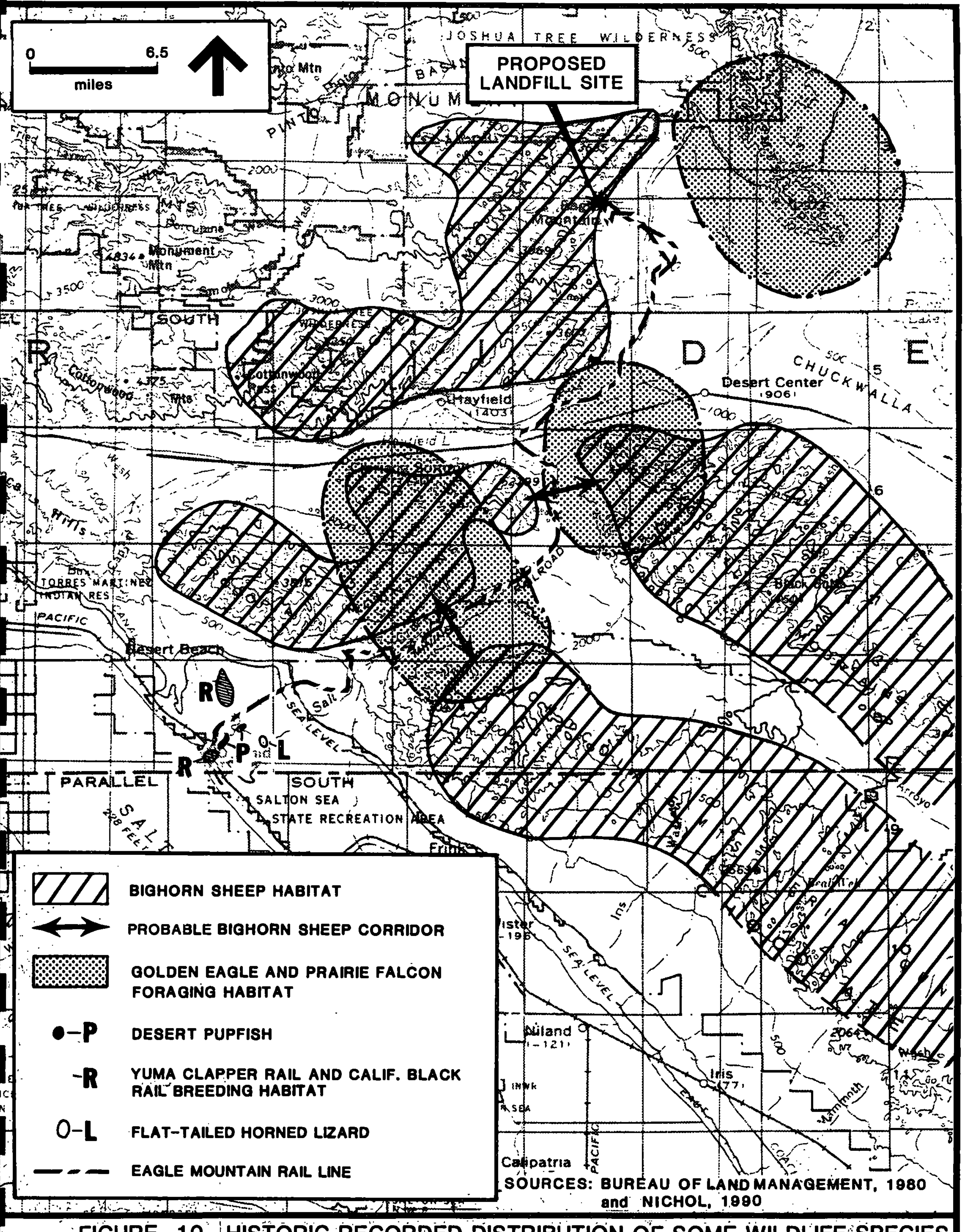


FIGURE 10. HISTORIC RECORDED DISTRIBUTION OF SOME WILDLIFE SPECIES OF SPECIAL CONCERN

RECON

114

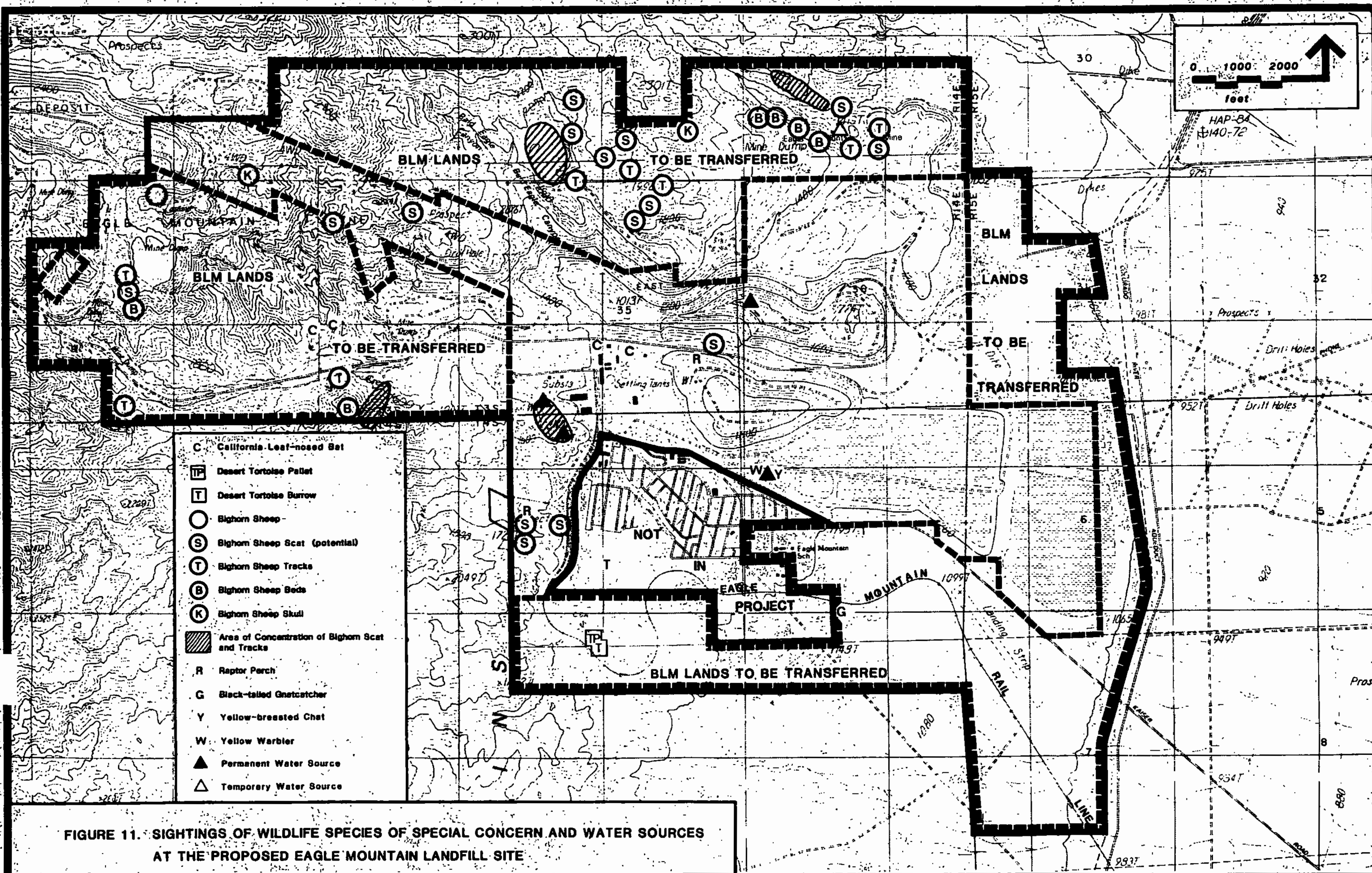


FIGURE 11. SIGHTINGS OF WILDLIFE SPECIES OF SPECIAL CONCERN AND WATER SOURCES AT THE PROPOSED EAGLE MOUNTAIN LANDFILL SITE

a population is very difficult, and an optimum value for the adult/juvenile ratio is not currently known.

Tortoises are active only during the warmer months of the year, with greatest activity in the spring. Their active season begins in early March and ends in late October or early November. They remain inactive in their burrows during the winter months. Tortoises are also relatively inactive during the peak of summer, when ambient temperatures are highest. There is evidence that the daily activity pattern of this species is dictated by air temperature. Tortoises are active primarily between ambient temperatures of 65 to 105 degrees Fahrenheit (18 to 42 degrees Celsius) (Karl, unpublished data), often resulting in a bimodal daily activity pattern, early morning and late afternoon. Rainfall also can stimulate tortoise activity, as they will emerge from their burrows to drink rainwater, even if ambient temperatures are not optimal (Nagy and Medica 1986).

The preferred diet of the desert tortoise consists primarily of ephemeral forbs and grasses, and perennial grasses (Burge and Bradley 1976, Hansen et al. 1976, Coombs 1979, Nagy and Medica 1986).

Courtship and mating typically occur in the spring, but not all adult tortoises within a population reproduce during a particular year. Nests are dug by the female tortoise, and anywhere from 2 to 14 eggs deposited (Ernst and Barbour 1972; Turner et al. 1986). Incubation time ranges from 98 to 135 days (Hohman et al. 1980). A breeding female may lay from one to three clutches in a summer (Turner et al. 1984, 1986).

Based upon data for desert tortoises in California, Arizona, Nevada, and Utah, the average home range of a tortoise is estimated to be between 27 and 131 acres (11 to 53 hectares) (Berry et al. 1986). Females typically have smaller home ranges than males. Long-term movement patterns for individual tortoises and whole populations are not well understood. It is not known how far an individual tortoise travels over the course of its lifetime, and in what patterns. It is also not known which individuals and groups are likely to migrate to other habitat areas, how long such movements take, and what conditions prompt or prohibit such movement (RECON 1990).

The desert tortoise sign found near the proposed Eagle Mountain landfill site is in a flat area south of the Eagle Mountain townsite on a parcel of public (selected) lands and outside of the project boundary. Any potential impacts to desert tortoise in this area from townsite development will be dealt with in the environmental documents to be prepared for the Specific Plan Area of the Eagle Mountain townsite.

2) Nelson's Bighorn Sheep. Nelson's bighorn sheep is a State of California fully protected species and a BLM sensitive species. Its current distribution extends from southern Colorado, Nevada, and Utah south to California, Arizona, New Mexico, Texas, and Mexico. In California, Nelson's bighorn sheep occur from the White Mountains on the north to the Mexican border and east to the Colorado River (Monson 1980). Monson (1980) stated that approximately 100 bighorn occurred in Joshua Tree National Monument and vicinity. Bighorn sheep prefer rough, rocky, and steep terrain. They depend on their climbing and hiding ability in this rough terrain to escape predators.

Bighorn sheep foraging areas consist of summer, fall-winter, and spring range. Summer range provides permanent water sources, fall-winter range is usually similar to the summer range, and spring range includes rugged terrain for lambing (McQuivey 1978). Optimal foraging distance is one mile or less from watering sources (Hansen 1980). The maximum foraging range must be within six miles of watering sources (Hansen 1980). Plant productivity in the desert depends on the amount and timing of rainfall. Rainfall patterns differ considerably between and among months and years and, in the area of the project site, are concentrated in the winter. The relationship of plant productivity and rainfall makes the availability of sheep forage unpredictable. In addition, a wide range of habitats is needed to support bighorn sheep because many plant species are productive only during certain rainfall patterns. Thus, bighorn must be able to move to good foraging areas between seasons.

Blong and Pollard (1968) found Peninsular bighorn sheep in the Santa Rosa Mountains requiring water sources daily during the heat of the summer. Ewes, lambs, and young rams stayed within two miles of water during the summer, while rams were observed traveling over three miles from water sources and returning to water less frequently (Blong and Pollard 1968).

Bighorn sheep move between mountain ranges. Although the reasons for this intermountain movement are unknown, corridors have been documented for sheep in the California desert area by the BLM. A summary of intermountain movements by mountain sheep (Schwartz, Bleich, and Holl 1986) and observations during sheep transplant programs indicate that bighorn sheep can travel long distances. For example, during a release program by BLM and Nevada Department of Wildlife (NDOW), one radio-collared ram was observed to travel 100 miles (Armentrout, pers. comm., 1990). Schwartz, Bleich, and Holl (1986) suggest that because of these movements, bighorn sheep may consist of "metapopulations" with a population occurring in each mountain range that is a subpopulation. These migrations increase the potential for genetic variability within the "megapopulation." They further conclude that these subpopulations would vary in numbers and genetic structure as habitat changes within a mountain range, creating a variable population structure through time. Bighorn sheep also appear to require large amounts of space because they become nervous and "run-down" in crowded conditions (Hansen 1980).

Populations of Nelson's bighorn sheep occur in the Eagle (50), Orocopia (50), Chuckwalla (35-40), and Chocolate mountains (100) in the broad vicinity of the proposed landfill site and the Eagle Mountain railroad right-of-way (see Figure 10). Habitat management plans have been developed for bighorn sheep in Orocopia and Chuckwalla mountain ranges (Figure 12). Ability of bighorn sheep to move between mountain ranges in search of seasonal forage and water is critical for sheep survival (Woodward-Clyde n.d.). Movement patterns are affected by forage and water availability, topography, climatic conditions, breeding activity, and sex of individuals (McQuivey 1978). Sheep corridors may exist between the Eagle and Coxcomb Mountain ranges (Weaver, pers. comm., 1990). Although the Eagle Mountain population appears stable, the Coxcomb subpopulation appears to be declining recently (Weaver, pers. comm., 1990).

Results of an aerial survey of the Eagle Mountains conducted by CDFG (U.S. Department of the Interior 1986) showed approximately 50 bighorn sheep residing in the mountains. Their report also indicates seven watering

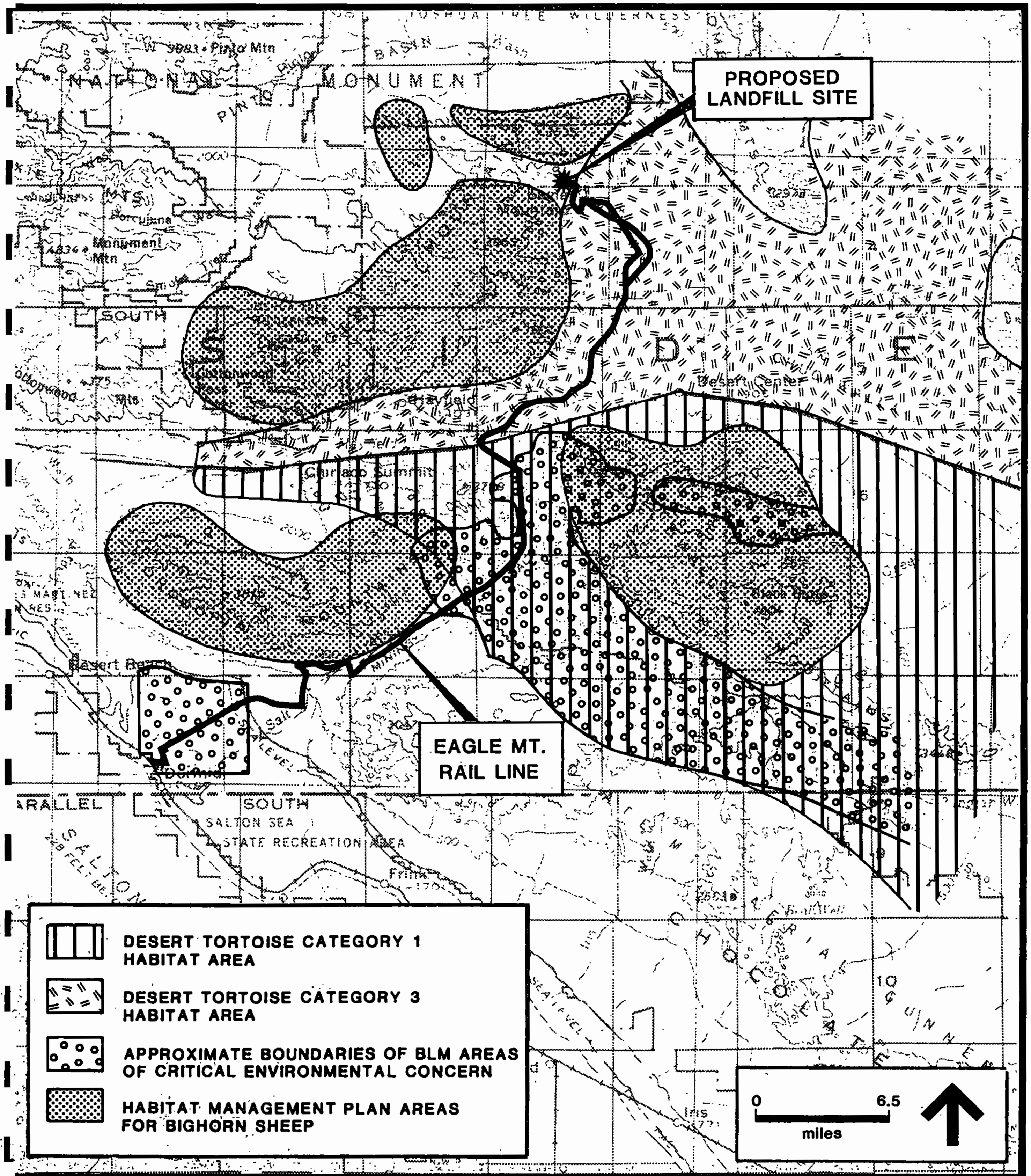


FIGURE 12. HABITAT MANAGEMENT AREAS

RECON

hole locations in the Eagle Mountains. A second survey by the BLM in 1990 showed 19 sheep in the immediate vicinity of the proposed Eagle Mountain landfill site, and also estimated a total of approximately 50 sheep in the Eagle Mountains.

Bighorn sheep sign was observed on all roads, ravines, and ridgetops within the Eagle Mountain landfill project boundaries. Bighorn sheep extensively use habitat on both the private and public (selected) lands on the proposed landfill site. One potential bedding area was observed in the northeast portion of the site. Local residents regularly observe up to 20 individual sheep drinking from the leaky water tanks west of the camp (Anderson, pers. comm., 1989). Sheep are also observed wandering through the tailing areas of the mining operations. Mine operators report that sightings of bighorn sheep near mine operations and roads in the past were common. Sheep would stand by the sides of the road and watch machinery pass (Anderson, pers. comm., 1989).

Evidence from mining personnel (Anderson, pers. comm., 1989) suggests that bighorn sheep may habituate somewhat to mining operations. Studies have shown that sheep will become habituated to construction activities as long as they can see the disturbance and the disturbance does not appear to the sheep to be dangerous to them (Campbell and Remington 1981; Leslie and Douglas 1980). Sheep habituated to the large machinery and activities associated with earlier mining operations and they did not avoid the area. Although bighorn sheep may habituate to human activity, this process may cause stress to the sheep, which could directly or indirectly affect their health.

3) Black-Tailed Gnatcatcher. The black-tailed gnatcatcher is a California species of special concern. This species occurs in washes and drainages throughout the deserts of southeastern California (Atwood 1988). It occurs up to about 2400 feet in elevation and in a wide variety of vegetation types. Black-tailed gnatcatcher populations have become reduced due to destruction of brush habitat and off-road-vehicle disturbances in washes (Remsen 1979). Brood parasitism by brown-headed cowbirds (*Molothrus ater*) may account for some population declines near agriculture. Black-tailed gnatcatchers were found in most washes on the Eagle Mountain landfill site that support dense native tree species.

4) Bats. A number of sensitive bat species could occur in mines, tunnels, caves, or old buildings in the Eagle Mountain landfill area. Three of these species are Category 2 candidate species for federal listing, California leaf-nosed bat (*Macrotus californicus*), California mastiff bat (*Eumops perotis*), and spotted bat (*Euderma maculata*). The California leaf-nosed bat, the spotted bat, the Townsend's big-eared bat (*Plecotus townsendii pallescens*) and pocketed freetail bat (*Tadarida femorosacca*) are CDFG species of special concern. All of these species occur in the general vicinity of the project site (Woodward-Clyde n.d.).

California leaf-nosed bat is locally common near water sources (Brown n.d.) in mountain ranges along the Colorado River from Needles to the Mexican border. Most specimens have been taken from mine tunnels in desert scrub habitat below 1,000 feet. Mine tunnels and caves are usually warmer than 80 degrees Fahrenheit and greater than 60 percent humidity with high ceilings (Brown n.d.). Brown states that most of the population of California leaf-nosed bats in the California desert are located in approximately 10 mine tunnel sites.

The California mastiff bat occurs from central California southward to central Mexico and has been recorded from the western portions of the southeastern desert region of California (Williams 1986). The nearest known location for this species is near Mecca in Riverside County. California mastiff bats form day roosts in large cracks of exfoliating granite. Cracks are approximately 2 inches wide and 12 inches deep, and narrow to at least one inch at their upper end. The crack must be at least six to nine feet from the ground for bats to launch into flight.

The spotted bat occurs from Montana south to northern Mexico and Baja California. They roost in caves and buildings in arid habitats and usually are observed singly. Little else is known about this species.

Townsend's big-eared bat is often found in mine tunnels but may also use caves. This bat occurs throughout the California deserts from sea level to 8,000 feet (Brown n.d.). The most important requirement is that the roost sites are completely free of human disturbance; one visit to a roost site will cause the bats to abandon it. No nursery colonies have been found in California (Brown n.d.).

Pocketed free-tailed bat is found to roost in crevices on cliffs. The only known roost site in California, in the Anza-Borrego Desert, is no longer occupied and no roost sites for this species are currently known (Brown n.d.). An adult was recently captured in Joshua Tree National Monument (Brown n.d.). Very little information of these bats' biology or distribution has been collected for eastern California.

The California leaf-nosed bat and sign of Townsend's big-eared bat were observed during directed surveys of the mine area (see Figure 11 and Attachment 1). A diurnal roosting site for the leaf-nosed bat was found in the mine tunnel (adit) west of the east pit. Pregnant female bats were captured in the night roosts, indicating that the diurnal roosting site may also be a maternity roost. Night roosts for this species were found in three additional sites. A second survey in December 1990, indicated that the mine adit also serves as a winter roost, and is a significant resource for the leaf-nosed bat. No other winter roost sites were found in the vicinity of the Eagle Mountain Mine (see Attachment 1). Sign of Townsend's big-eared bat was also found in the adit. The bat droppings observed near the entrance to the adit were in a typical formation signifying evidence of a maternity roost. However, the droppings were at least one year old and no individuals were observed during the survey. A complete description of the surveys including methodology and results are found in Attachment 1. Water supplies in the project site are an important limiting resource for many species of bats. No bat roosts were found on public (selected) lands at the Eagle Mountain landfill site.

5) <u>Wildlife Species With the Potential for Occurrence</u>. The following species were not observed during the field surveys, but could occur on the site given known wildlife distributions and habitat preferences.

The golden eagle (*Aquila chrysaetos canadensis*) is a California fully protected species and a BLM sensitive species. It is also protected by the Federal Bald Eagle Protection Act. This species was a common resident throughout California prior to the 1940s (Remsen 1979). In 1979, 500 pairs were estimated in California (Remsen 1979). Secondary poisoning, loss of open habitat, shooting, and nest robbing are cited as the main cause of eagle declines in abundance. Golden eagles do not reside near towns or cities. Golden eagles inhabit open country with nearby cliffs, ledges, or tall trees for nesting and open country for foraging. BLM (1980) has identified three areas of potential foraging habitat near the vicinity of the project site (see Figure 10). One of these areas is the flat, open habitat east of the Eagle Mountain Mine.

Golden eagles were not observed in the mine area during the survey; however, potential perching and roosting sites were observed in undisturbed and disturbed habitat. Not all of the site was surveyed, especially the most inaccessible areas where the eagles may use rock outcrops, ledges, and ridgetops for perching and roosting. No appropriate nesting habitat was observed on the site. Foraging habitat was observed on the flatter portions of the mine project and in ravines and washes of the Eagle Mountains.

Peregrine falcon (*Falco peregrinus*) is a federal and state listed endangered species. Its fast flight and dramatic stoops made it a favorite bird of falconers and its populations were reduced by nest robbing. In addition, this species was severely reduced in abundance by secondary pesticide poisoning. Peregrine falcons are extremely rare in the west, where they nest in remote cliffs and have been released and established on some city buildings. This species forages primarily on waterfowl. It was once a common wintering bird along the Colorado River (Bernard and Brown 1977). In the Eagle Mountain area, this species probably is found only during the winter season (Woodward-Clyde n.d.). It may use undisturbed cliff areas in the project area for roosting or perching.

Prairie falcon (*Falco mexicanus*) is a CDFG species of special concern. Populations have been reduced by grassland conversion, falconry, collecting, pesticide poisoning, and shooting (Remsen 1979). This species is found throughout the western United States in open rangeland, ridges, mountains, and deserts. It nests in undisturbed, inaccessible cliffs, ledges, and rocky bluffs near open valleys (Bernard and Brown 1977). Prairie falcon populations in 1979 (Remsen 1979) were reported to be stable in the deserts of California. Prairie falcons have been reported to nest in many of the mountain ranges in the Colorado Desert (Woodward-Clyde n.d.).

No prairie falcons were observed during the survey. Inaccessible cliffs and ledges that could be used by these birds as nesting sites may not have been seen due to limited access to many of these sites. Undisturbed habitat in the proposed Eagle Mountain landfill area could be used by foraging prairie falcons.

The burrowing owl (*Athene canicularia*) is a CDFG species of special concern and is protected under the Federal Migratory Bird Act. Burrowing owls range throughout California in arid grasslands and open shrub communities. They are found in high concentrations in the Imperial Valley and in sparse numbers in desert scrub habitats (Bernard and Brown 1977). They typically construct nests in burrows of other animals for use as cover and for raising young. Burrowing owls usually nest in flat to rolling hilly terrain and not in steep, rocky soils. A burrowing owl may use more than one burrow system in its territory. Burrow size ranges from three inches to nine inches in diameter. Loss of habitat, especially conversion to irrigated agricultural practices, is the primary reason for population reduction and has led CDFG to consider listing the species.

Burrowing owls would only be found in the flatter portions of the Eagle Mountain project boundaries. They would probably not nest in the washes on the proposed landfill site. No burrowing owls or their nests were observed during the surveys. However, not all habitat was observed in enough detail to determine if this species occurs in the area.

Gila woodpecker (*Centurus uropygialis*) is a CDFG endangered species. This medium-sized woodpecker is a resident of California only in the riparian habitat of the Colorado River and very rarely in cottonwood trees of the Imperial Valley (Remsen 1979; Bernard and Brown 1977). No riparian habitat exists in the mine area for this species to breed, but it has been infrequently observed foraging in habitat found within areas of the Woodward-Clyde (n.d.) study boundaries of the Colorado Desert.

Swainson's hawk (*Buteo swainsoni*) is a CDFG threatened species and a federal Category 2 species for listing. Swainson's hawks are very rare raptors throughout their range in California. Populations have been declining since the 1930s, and this decline may have been caused by pesticides, conversion of occupied habitat to irrigated intensive agriculture, and elimination of riparian woodland (Remsen 1979). Swainson's hawks occur in open grasslands, brushlands, and forested habitats. They utilize riparian forests for breeding sites and use open habitat nearby to forage for their primary food source, voles. The Swainson's hawk is observed occasionally in Imperial Valley and along the Colorado River during spring and fall migrations (Bernard and Brown 1977). This species may concentrate during migration in wildflower fields hunting for insects. It has not been documented as a breeder in the vicinity of the project site (BOR 1989).

Black-shouldered kite (*Elanus caeruleys*) is a California fully protected species. Kites nest in riparian woodlands, live oaks, and sycamores and forage over grasslands, open brushland, and open fields. This species forages almost exclusively on voles and small mammals. They are found in marshy bottomlands with clumps of trees during the winter (Bernard and Brown 1977). They are dependent on rapidly disappearing riparian habitat and their populations may become restricted due to this habitat loss. Woodward-Clyde (n.d.) states that kites may occur in any of the habitats found within their study boundaries, which included the Colorado and Mojave deserts of eastern California.

Eagle Mountain scrub jay (*Aphelocoma coerulescens cana*) is a subspecies of scrub jay only known to occur in the pinyon/juniper woodland habitat on the upper elevations of Eagle Mountain, in Joshua Tree National Monument (Peterson 1990). This bird is believed to have originated by hybridization between coastal and interior jay populations (Peterson 1990). The population is estimated at only 40-50 birds confined primarily to 150 of pinyon/juniper woodland near the peak of Eagle Mountain (Peterson 1990, Hays, pers. comm., 1991). This subspecies has been proposed by the USFWS as a Category 2 Candidate species. The status of this bird is likely to change as more information is collected. Eagle Mountain is located approximately 18 miles from the landfill site. No scrub jays were observed on the project site during any of the biological surveys.

Three thrasher species including Bendire's thrasher (*Toxostoma bendirei*), LeConte's thrasher (*Toxostoma lecontei*), and Crissal thrasher (*Toxostoma crissale*) are CDFG species of special concern. They all utilize fairly dense, shrubby habitats such as those typically found in the washes of the mine project site. Occurrences have been documented in the Colorado and Mojave deserts of eastern California (Woodward-Clyde n.d.).

Bendire's thrashers usually breed in woodlands or *Opuntia*-dominated vegetation, but a few unsubstantiated reports of this species have been from the desert scrub between Needles and Blythe (Bernard and Brown 1977). Bendire's thrasher would probably be observed during migration. LeConte's thrashers breed from Antelope Valley to the Anza-Borrego Desert. This species is found in very sparse desert scrub, especially around desert washes (Bernard and Brown 1977). Crissal thrasher is found in dense brush and wash vegetation near riparian woodlands from the Colorado River to Palm Springs, although it is not common (Bernard and Brown 1977).

The long-eared owl (*Asio otus*) is a California species of special concern. Long-eared owls nest in wooded washes, drainages, and oases (Bernard and Brown 1977). They may winter roost in groves of large tamarisk trees, such as those at Lake Tamarisk near Eagle Mountain Mine.

Four migrant species of passerine birds may be found in washes with brushy vegetation: Virginia's warbler (*Vermivora virginiae*), purple martin (*Progne subis*), yellow warbler (*Dendroica petechia*), and yellow-breasted chat (*Icteria virens*). These species would only be found during the spring and fall migrating seasons, and they may use the habitat for foraging or resting areas. Purple martin is a very rare migrant, although it is regularly seen at the Salton Sea (Bernard and Brown 1977).

American badger (*Taxidea taxus*) is a California species of special concern that is found in dry, open habitats of many types. Although the distribution of this species extends well beyond California, numbers of badger have declined significantly throughout California. This species has declined due to habitat loss in western and southern parts of the state, poisoning, and trapping for the fur trade (Williams 1986). A regional study of the southern Mojave and northern Colorado Desert basin in California revealed "uncommon" abundances of badger throughout the area (Woodward-Clyde n.d.). Badgers have been recorded in the Pinto Basin of Joshua Tree National Monument just north of the proposed Eagle Mountain landfill site (Williams 1986).

b. <u>Eagle Mountain Railroad Right-of-Way</u>

1) <u>Desert Tortoise</u>. The Eagle Mountain railroad right-of-way falls within the BLM CDCA. Portions of the railroad fall within the Chuckwalla Bench ACEC and within Category 1 and 3 designated desert tortoise habitat, as shown in Figure 12. Category 1 habitat areas are those which are the most important for management consideration and Category 3 is the lowest. Portions of the CDCA have been surveyed by BLM for tortoise densities (Berry and Nicholson 1984). Tortoise densities of 100 to 250 animals per square mile have

been reported in habitat along the Eagle Mountain railroad just south of I-10 (Figure 13). Lower tortoise densities of 20 to 50 animals per square mile have been documented adjacent to the high density habitat along the Eagle Mountain railroad north and south of the interstate.

Desert tortoises and their sign were observed throughout most of the habitat within the railroad corridor south of the mine to the Coachella Canal (see Figures 8a-e). Portions of the railroad right-of-way north of I-10, and directly south of I-10, showed the most sign in each mile of railroad corridor surveyed. At least one sign of desert tortoise was observed along every mile of the railroad corridor from approximately 10 miles north of I-10 south to the Coachella Canal.

2) Bighorn Sheep. Locations of evidence for bighorn sheep utilizing the habitat along the railroad right-of-way are shown in Figures 8a-e. Probable bighorn sheep scat and tracks were observed south of I-10 as far south as the Coachella Canal and in the parcels owned by Kaiser Steel Resources to be offered in trade to the BLM in Salt Creek. One ewe was observed within the 200-foot railroad corridor in badlands in the Salt Creek wash.

As discussed above, bighorn sheep move between mountain ranges. Potential corridors for bighorn sheep movement occur between the Chocolate and Orocopia mountains, the Eagle and Coxcomb mountains, and between the Chuckwalla and Orocopia mountains (see Figure 10). Two of these corridors are bisected by the Eagle Mountain railroad right-of-way.

3) Desert Pupfish. The desert pupfish (*Cyprinodon macularius*) is a federal and state endangered species. It is a minnow-sized member of the killifish family and is found in the lower Colorado and Gila Rivers from southern Arizona to eastern California and northern Sonora, Mexico (Lee 1980). Populations have become established in the Salton Sea. Desert pupfish occur in a wide variety of habitats with harsh environmental fluctuations in oxygen, temperature, and salinities (Lee 1980). Desert pupfish populations fluctuate widely between years and seasons and are particularly regulated by the amount of rainfall occurring during the winter season. As smaller pools begin to dry during the summer, the fish move to other pools which maintain water throughout the dry season.

In a survey conducted by CDFG in 1986, a population of 70 pupfish was found approximately one-quarter mile south of the Eagle Mountain railroad trestle crossing the tributary of Salt Creek (see Figure 10) (Nicol, pers. comm., 1986). This location is approximately two and one half miles upstream from the Salton Sea (NW/4 Section 23 T8S R11E). Surveys conducted in early June, 1990 found 125 pupfish in the same area of the tributary to Salt Creek; however, a flash flood in June reduced the pupfish population to 2 fish by June 16. Transplanted populations occur in the BLM reserve at Rancho Dos Palmas, which is located upstream approximately two miles north of the Kaiser railroad trestle.

The area directly under the Eagle Mountain railroad trestle in the tributary noted above is potentially appropriate desert pupfish habitat and may be used by this species. The tributary provides a potential corridor underneath the railroad for movements of pupfish up- and downstream of the railroad crossing.

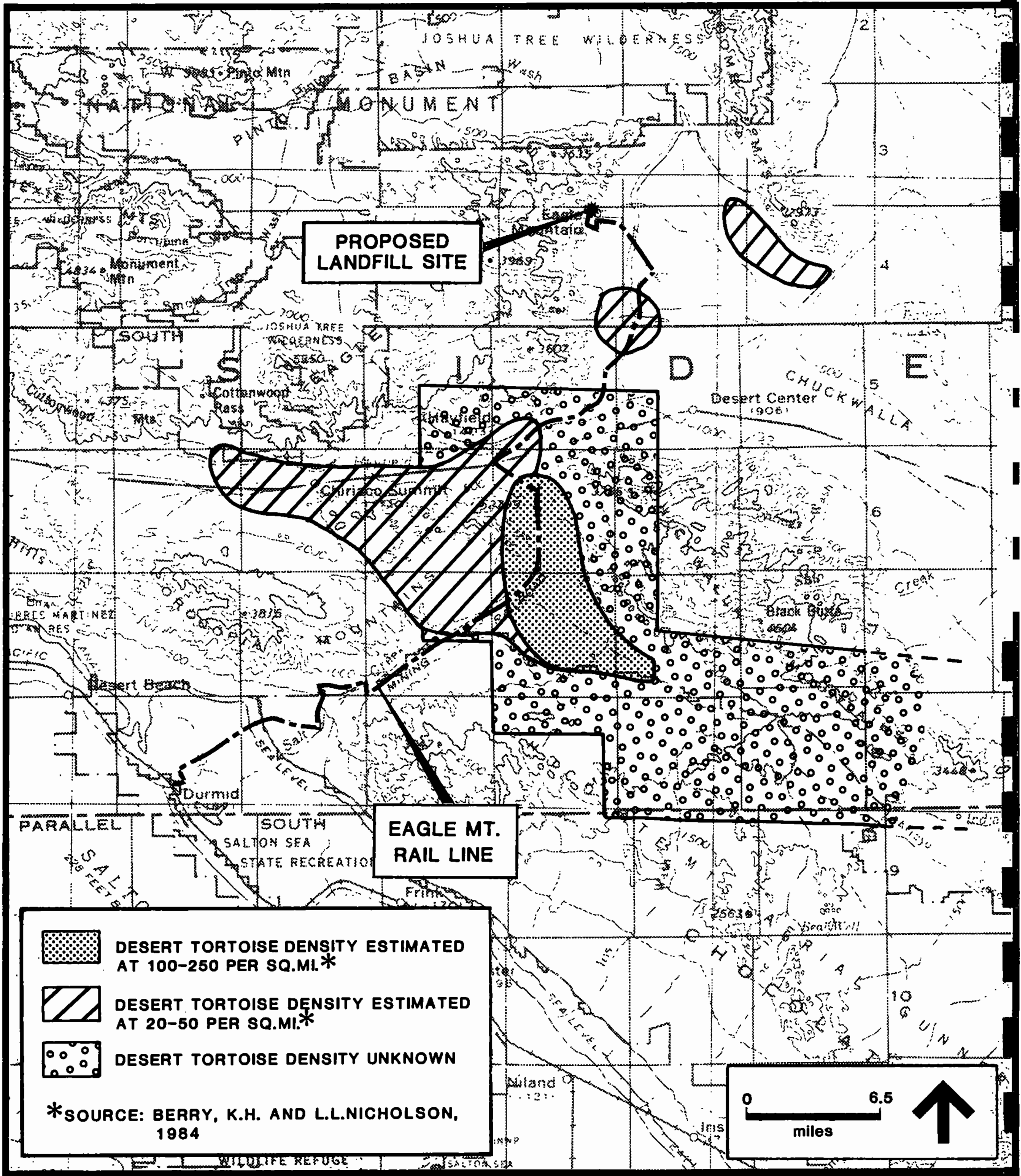


FIGURE 13. DESERT TORTOISE DISTRIBUTION

RECON

Surveys conducted by CDFG in May and June, 1990, found no pupfish in an alkali pond within the railroad right-of-way (on the northwest side of the railroad) east of the Salt Creek tributary. Pupfish could enter this pond in years of high rainfall and during flooding of Salt Creek (Nicol, pers. comm., 1990). The results of the pupfish survey indicates that no pupfish or any other fish species occur in the pond, nor were any invertebrates or algae were observed.

4) Flat-Tailed Horned Lizard. The flat-tailed horned lizard (*Phrynosoma mcalli*) is a CDFG candidate for endangered status and a USFWS Category 1 candidate for listing as threatened or endangered. This species occurs in areas of flat topography in sandy soils from fine, windblown soils to more stabilized dunes and soils that are more coarse (Dunham 1989). They are generally associated with creosote bush/bur-sage vegetation communities (Stebbins 1985). This species does not occur in dense vegetation, tamarisk-arrowweed thickets, or major dune systems (Dunham 1989). Horned lizards are also restricted to areas occupied by ants, their primary food source.

Two sightings of flat-tailed horned lizard scat were made along the railroad right-of-way approximately 1.5 miles south of I-10. In general, habitat along the railroad corridor would not support flat-tailed horned lizard because of the lack of windblown sands.

5) Black-Tailed Gnatcatcher. Black-tailed gnatcatchers were observed utilizing habitat along the railroad corridor, especially in the vegetation of the drainages and washes. Gnatcatchers were commonly observed in ironwood, smoke tree, and palo verde trees. Gnatcatchers were observed intermittently from the proposed Eagle Mountain landfill site to the saltbush scrub habitat south of Coachella Canal. All habitat could be utilized by gnatcatchers.

6) American Badger. One badger burrow was observed along the railroad south of I-10 (see Figure 8c).

7) Northern Harrier. The northern harrier (*Circus cyaneus*) is a California species of special concern. It ranges throughout California in grasslands, fields, and salt and freshwater marshes. This species utilizes a wide variety of habitats for foraging, and it nests on or near the ground in grassland, slough, marsh, and brushy habitats. Populations of northern harriers have declined since the 1940s due to habitat loss, drainage and rechannelization of wetlands, and grazing (Remsen 1979). Northern harriers are a resident in appropriate habitats in the vicinity of the project site (Woodward-Clyde n.d.) and would be expected to utilize the open desert habitat of flat and rolling terrain for winter foraging. One northern harrier was observed foraging over desert wash habitat north of I-10 (see Figure 8c).

8) Wildlife Species With the Potential for Occurrence. Yuma clapper rail (*Rallus longirostris yumaenesis*) is a federally endangered species, a CDFG threatened species, and a BLM sensitive species. It nests in marshes along the Colorado River and at the Salton Sea. Distributions vary yearly depending upon local water conditions (State of California 1980). Clapper rail habitat consists of freshwater marshes dominated by emergent vegetation, shallow water, and high ground for nesting areas. Primary food sources are crayfish, although they will feed on small fish, clams, and aquatic insects.

Surveys conducted by the BOR in 1988 (1989) revealed approximately eight Yuma clapper rails in March and six in April in the Salt Creek marsh area near Dos Palmas Ranch. Clapper rail habitat is shown in Figure 10.

No Yuma clapper rails were observed within 100 feet of the railroad bed during this survey. Clapper rails need over seven hectares of habitat to breed and forage (Eddleman 1989). They spend very little time outside of the nesting area. Because habitat along the railroad is much smaller than documented clapper rail habitat requirements, no clapper rails are expected to occur along the railroad corridor. Yuma clapper rails have been documented less than one mile from the railroad right-of-way (BOR 1989).

California black rail (*Laterallus jamaicensis coturniculus*) is a CDFG endangered species, a Category 1 candidate for federal listing, and a BLM sensitive species. This small, secretive bird lives in freshwater marshes and coastal marshes. This species has been reported from marshes in the Colorado River system and along the Coachella Canal (State of California 1980). A recent survey by the BOR (1989) reported black rails in the Salt Creek area north of the railroad and in similar habitat as the Yuma clapper rail.

No California black rails were observed during the survey. No habitat of appropriate size was found along the railroad corridor. Black rails are not known to travel very far from their breeding territories to forage or roost. Thus, no rails are expected to utilize the marsh vegetation along the railroad right-of-way.

Peregrine falcon may forage for waterfowl in the Salton Sea and Salt Creek area, and also use nearby cliffs for roosting and perching. No appropriate roosts or perches occur in the railroad corridor. Peregrine falcons have only been observed wintering in the area of the project site (Woodward-Clyde n.d.).

Gila woodpecker would be found only as a vagrant or migrating species in the habitat along the railroad corridor. It may utilize this habitat for foraging or roosting during migration.

Golden eagle foraging habitat has been identified by BLM along two stretches of the railroad (see Figure 10). No golden eagles were observed during the survey, but time spent along the railroad was too limited to have discerned the foraging use of the area by such a mobile species.

Prairie falcons and black-shouldered kites may use the habitat along the railroad corridor for foraging for small mammals. No appropriate nesting sites were found in the corridor.

No burrowing owls or their burrows were observed during the survey. Burrowing owls may nest in habitat adjacent to the railroad corridor and use the corridor for foraging for small mammals.

Three sensitive thrasher species could potentially occur in habitat along the railroad, including Bendire's thrasher, LeConte's thrasher, and Crissal thrasher. An unidentified thrasher call was heard during the survey and may belong to any of these three species. Thrashers may breed and forage in the denser vegetation of the washes that cross the railroad right-of-way.

Most of the sensitive bird species, if found in the area, would only use the railroad corridor for foraging. These species include black-tailed kite, Swainson's hawk, long-eared owl, and purple martin. As discussed above, Virginia's warbler, yellow warbler, and yellow-breasted chat would only be found in the railroad corridor during the spring and fall migration period.

c. Eagle Mountain Road Improvements, Road Extension, and Railroad Spur. No sensitive wildlife species were observed along the Eagle Mountain Road extension or rail spur corridors. A few signs of desert tortoise activity were found along the Eagle Mountain Road corridor (see Figure 9a).

Habitat in the Eagle Mountain Road corridor is generally made up of very open brush vegetation and pavement plains. Some of the habitat is very rocky, with a few drainages and one major wash crossing the corridor. Species potentially utilizing this habitat are few and include badger, black-tailed gnatcatcher, and the three sensitive thrasher species. Although much of this area is classified as Category 3 desert tortoise habitat, little sign of tortoise activity was found during the field survey. Other species potentially utilizing the site as foraging or wintering habitat include black-shouldered kite, golden eagle, prairie falcon, northern harrier, long-eared owl, and the migrant species described above.

d. Kaiser Steel Resources Properties and Proposed Open Space Parcel. These properties are very similar in the wildlife habitats found on them and probably support a similar diversity of species. The species described above in detail which would potentially occur on these parcels are American badger, burrowing owl, black-tailed gnatcatcher, and the three thrasher species.

Desert tortoises and their sign, including burrows, pallets, and scat, were observed in most areas of these parcels. In the parcel north of I-10, the habitat gradually changed from good tortoise habitat in the southwest to low potential tortoise habitat in the northeast. The two parcels directly south of I-10 also showed sign of a relatively dense population of tortoises. The parcels just north of Coachella Canal showed little sign of utilization by tortoises. Only one shell was observed and one burrow was seen in the berm along the railroad. No tortoise sign was observed in any of the three parcels south of the Coachella Canal.

Potential Nelson's bighorn sheep scat and tracks were observed in the parcels owned by Kaiser Steel Resources to be traded to BLM in Salt Creek wash. Nelson's bighorn sheep may also use some of the parcels just south of I-10, as part of their summer range or as a movement corridor. The quarter-section parcel south of the Coachella Canal (NE/4 Section 19) had sign of bighorn sheep.

Most of the significant bird species, if found in the area, would use the habitat in the parcels for foraging. These species include golden eagle, prairie falcon, northern harrier, black-tailed kite, Swainson's hawk, long-eared owl, and purple martin. As discussed above, Virginia's warbler, yellow warbler, purple martin, and yellow-breasted chat would be found during the spring and fall migration.

All parcels either supported black-tailed gnatcatchers or had high potential to do so. No other sensitive wildlife species were observed on these parcels.

V. EVALUATION OF IMPACTS

Impacts discussed in this section are based on the general engineering plans and operation procedures prepared to date. The current plan is a general level document; additional levels of detail will allow more specific analysis of potential impacts. Because the landfill will operate over a long period of time, additional impact analyses may be required. Implementation of the project plan would eventually result in use of approximately 1,150 acres of natural habitat within the Landfill Specific Plan Area. Along the corridors of both the Eagle Mountain railroad and the Eagle Mountain Road extension, and additional 1,260 acres may be subject to temporary disturbances or effects related to railroad and truck operations. This figure is the area of the entire 200-foot-wide corridors which were surveyed, and does not represent a quantitative determination of actual impacts. Table 6 summarizes these areas.

Impacts would occur to significant plant and wildlife species at the proposed Eagle Mountain landfill site, along the Eagle Mountain railroad right-of-way, and along the Eagle Mountain Road extension. No impacts will occur on the Kaiser Steel Resources properties to be offered to BLM, except indirect effects from railroad operations.

Impacts to desert habitat would occur with improvements and widening of the Eagle Mountain Road and its extension. The existing road will be widened by 20 feet which, with the proposed right-of-way would impact approximately 76.4 acres of desert habitat, while the construction of the road extension and railroad spur would have a right-of-way of 110 feet and impacts to 73.6 acres of desert habitat.

During maintenance and rehabilitation activities along the railroad, the storage of equipment and material, parking of vehicles and other staging activities would be confined to three existing staging areas at Ferrum, Summit, and Red Cloud. These sites are already disturbed; therefore, no additional habitat would be impacted.

A. REGULATORY ISSUES

Drainages within the Eagle Mountain Mine and along the railroad and Eagle Mountain Road come under the jurisdiction of the U.S. Army Corps of Engineers (USACE), since they qualify as "waters of the United States" under Section 404 of the Clean Water Act. The USACE is responsible for administering these regulations and the permit required is a 404 permit. As part of the permit process, the USACE may request that the USFWS and the Environmental Protection Agency provide input.

The CDFG has jurisdiction over the drainages and the Coachella Canal through Section 1600-1603 of the Fish and Game Code. Any diversion or alteration to major washes and drainages or impacts to wetland habitats would require an agreement with CDFG whose current policy is to allow no net loss of wetland habitat quantity or quality. Section 1600-1603 requires that an Agreement between the developer and CDFG be accomplished regarding the mitigation for

TABLE 6
SUMMARY OF AREAS SUBJECT TO POTENTIAL IMPACTS FOR EAGLE MOUNTAIN LANDFILL PROJECT

Site	Approximate Natural Habitat (acres)	Miles
Eagle Mountain landfill		
Landfill perimeter	991	
Drainage channel	3	
Facilities*	154	
Total	1,148	
Eagle Mountain railline right-of-way		
Category 1	0	10
Category 3	0	18
Uncategorized	0	24
Total	0	52
Eagle Mountain Road, road extension, and rail spur (Category 3)#	150	13
TOTAL	1,298	

*Parking lots, staging facility, and railroad spur.

#BLM desert tortoise habitat areas; Category 1 most important.

habitat lost as part of the "Streambed Alteration." Typically, this involves the same or similar mitigation program proposed for the federal permit.

B. PLANTS

For each development area (Eagle Mountain landfill site, Eagle Mountain railroad right-of-way, Eagle Mountain Road and the Kaiser Steel Resources properties), a discussion outlining the impacts to sensitive plant species and their habitats is presented. An impact summary for the entire project is included in Table 7.

1. Proposed Eagle Mountain Landfill Site

Two main concentrations of Alverson's foxtail cactus occur at the proposed landfill site. One concentration occurs in the southern portion of the proposed storage area (165 acres; at least 80 plants) and one concentration occurs along the southwestern perimeter of the landfill footprint in the Eagle Creek Wash on the north side of the mine road (125 acres; at least 200 plants). The 125 acres of Alverson's foxtail cactus habitat within Eagle Creek Wash will be impacted by the landfill. Approximately 7.6 acres of habitat for this species in planning area 4 will be impacted by the Eagle Mountain Road Extension and Railroad spur. Both of these cactus concentrations occur primarily on public (selected) lands. These impacts are considered significant.

Measures to reduce localized significant impacts to the Alverson's foxtail cactus population at the proposed landfill site shall involve the preservation of a portion of the Alverson's foxtail cactus population and its habitat on the proposed landfill site in open space with a conservation easement. Approximately 157.4 acres of Alverson's foxtail cactus habitat in planning area 4 in the Specific Plan storage area will be preserved. Much of this conservation easement is on public (selected) lands.

Impacts are expected to occur to a portion of the population of California barrel cactus in the proposed landfill area. A large proportion of the individuals of this population would be contained in areas designated for open space. Impacts to this species are not considered to reach a level of significance requiring mitigation based on the relative magnitude of the losses from this project in relation to the overall distribution of the species.

Based on survey results and distributional data for other sensitive plant species with the potential for occurrence in the proposed Eagle Mountain landfill area, no significant impacts are anticipated.

2. Eagle Mountain Railroad Right-of-Way

Five plant species of concern were found within the 200-foot right-of-way corridor along the railroad: California barrel cactus, Alverson's foxtail cactus, Orocopia sage, unicorn-plant, and crucifixion thorn. Among these, only the Orocopia sage has the potential for significant impacts because the shrubs are concentrated in a small area. Large impacts are not expected to occur to this species since rehabilitation and maintenance activities along the railroad will not involve large disturbances. The potential for the loss of a few individuals growing immediately next to the railroad tracks and access road can

TABLE 7
SUMMARY OF IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES
AND THEIR MITIGATION
AT THE PROPOSED EAGLE MOUNTAIN LANDFILL PROJECT

Species	Impacts	Impacted Habitat (acres) of Potential Habitat	Mitigation/Compensation
		LISTED SPECIES	
Desert pupfish	Loss of individuals and habitat, degraded habitat	<1	Monitoring program, emergency accident plan including biologist, construction design modifications
Desert tortoise	Loss of habitat and potential loss of individuals, potential increased raven predation, potential reduction in gene flow and population fragmentation	150	Preoperation surveys and relocation, raven control plan, railroad and roadway barriers and culverts, employee education, off-site preservation of 375 acres of Category 1 tortoise habitat, monitoring programs
Peregrine falcon	Not significant		
Swainson's hawk	Not significant		
Yuma clapper rail	Not significant		
California black rail	Not significant		
Gila woodpecker	Not significant		
Eagle Mtn. scrub jay	Small potential for increased raven predation upon jay eggs and young from a landfill-caused increase in the regional raven population	371	Raven monitoring and control program

TABLE 7
SUMMARY OF IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES AND THEIR MITIGATION AT THE PROPOSED EAGLE MOUNTAIN LANDFILL PROJECT
(continued)

Species	Impacts	Impacted Habitat (acres) of Potential Habitat	Mitigation/Compensation
		OTHER SENSITIVE SPECIES	
Alverson's foxtail cactus	Loss of many individuals at proposed landfill site	158.3	Transplant program designed to relocate individual cactus to areas to be rehabilitated at the proposed landfill site.
California barrel cactus	Not significant		
Orocopia sage	Not significant, potential for small losses of individuals		Avoidance, minimize unavoidable impacts by restricting maintenance activities in areas supporting Orocopia sage populations.
Crucifixion thorn	Not significant		
Unicorn-plant	Not significant		
Flat-tailed horned lizard	Not significant		
Bat species*	Potential loss of roosting areas, hibernacula, water sources		Preservation of adit opening
American badger	Not significant		

TABLE 7
SUMMARY OF IMPACTS TO SENSITIVE BIOLOGICAL RESOURCES
AND THEIR MITIGATION
AT THE PROPOSED EAGLE MOUNTAIN LANDFILL PROJECT
(continued)

Species	Impacts	Impacted Habitat (acres) of Potential Habitat	Mitigation/Compensation
Nelson's bighorn sheep	Loss of four water sources, loss of habitat stress from landfill operations	994	Create and enhance off-site water sources, telemetry monitoring study, preservation of 644 acres of habitat on-site, firearm restrictions
Black-shouldered kite	Not significant		
Golden eagle	Not significant		
Prairie falcon	Not significant		
Northern harrier	Not significant		
Burrowing owl	Not significant		
Long-eared owl	Not significant		
Black-tailed gnatcatcher	Not significant, habitat is abundant in the project vicinity	994	
LeConte's thrasher	Not significant, habitat is abundant in the project vicinity	994	
Other birds*	Not significant		

*See text for description of species.

probably be avoided. Unavoidable impacts to this species at this level of disturbance would not be considered a significant impact. The other four sensitive species present in the survey corridor occur as widely scattered individuals along the railway. Losses to Alverson's foxtail cactus, California barrel cactus, unicorn-plant, and crucifixion thorn along the railroad would be minimal and not significant. However, the small losses of Alverson's foxtail cactus along the railway would contribute to the cumulative loss of this species over the entire project.

3. Eagle Mountain Road Improvements, Road Extension, and Railroad Spur

Widening the existing Eagle Mountain Road by 20 feet, in conjunction with the new right-of-way totaling 110 feet, will cause the loss of approximately 76.4 acres of desert habitat. Impacts caused by this improvement of the existing Eagle Mountain Road will not significantly impact any local populations of plant species of concern, however, the potential loss of low numbers of Alverson's foxtail cactus would contribute to the cumulative loss of this cactus throughout the entire project.

The proposed 110-foot-wide right-of-way for the proposed extension of Eagle Mountain Road and the accompanying railroad spur would impact a total of 25.7 acres of Alverson's foxtail cactus and California barrel cactus habitat in addition to the impacts from these improvements on habitat for these cactus mentioned under the Eagle Mountain Mine site above. This loss of Alverson's foxtail cactus habitat would be considered significant. No significant impacts are anticipated to other plant species of concern with the potential for occurrence within the road extension/railroad spur corridor.

4. Kaiser Steel Resources Properties (Offered Lands)

No anticipated impacts to plant species of concern will occur on the Kaiser Steel Resources properties to be traded to the BLM.

C. WILDLIFE

This section describes impacts to wildlife species of special concern at the proposed Eagle Mountain landfill site (both private and selected lands), the Eagle Mountain railroad right-of-way, and the Eagle Mountain Road, road extension, and rail spur. Table 7 provides a summary of impacts to sensitive wildlife species.

1. Proposed Eagle Mountain Landfill Site

a. Desert Tortoise. The landfill does not extend into desert tortoise habitat; thus, no direct construction impacts to desert tortoise habitat will occur in the landfill site area.

Indirect impacts to any tortoises in the vicinity of the Eagle Mountain landfill site, and to the Chuckwalla Valley tortoise population, could occur from raven predation upon juvenile tortoises. Landfills attract ravens because of the easily obtained food source and ravens have been observed traveling up to 30 miles from nesting territories to landfills. The additional food source from landfills does not discourage predation upon juvenile tortoises near the landfill and near the raven's territories. Additional food sources increase the size and number of raven clutches and the successful fledging of birds, thus, increasing the local raven population. A potential increase in the local raven population, coupled with the movement of ravens into habitat near the landfill, could result in increased tortoise losses from predation.

Joshua Tree National Monument currently has no raven control policy or program. However, recent surveys do not indicate that the desert tortoise and raven populations are out of natural balance in the monument (Moon, pers. comm., 1990). The park recently initiated a raven monitoring program, and they are developing a desert tortoise management plan. This plan would include raven predation monitoring, tortoise studies, raven nesting studies, raven counts, and number of tortoises found under nests (Moon, pers. comm., 1990).

b. Nelson's Bighorn Sheep. An impact to the bighorn sheep population in the Eagle Mountains is the removal of one permanent water source (the pond at the bottom of the east pit), the potential loss of two other permanent water sources (the two leaking water tanks on the south-central portion of the property), and the loss of one temporary water source (at the northeast corner of the mine) within the project boundary. All of these water sources are on private lands. The CDFG (U.S. Department of the Interior 1986) found only seven watering sources for bighorn sheep in the Eagle Mountains, thus making the loss of any watering source a severe reduction. Sheep range is limited by the lack of accessible water sources during the dry summer months.

Additional impacts to bighorn sheep will occur with the loss of approximately 994 acres of previously undisturbed natural land, which is appropriate habitat for sheep. Most of this habitat is on public (selected) lands. This habitat is considered prime sheep range (Weaver, pers. comm., 1990; Armentrout, pers. comm., 1990). Loss of habitat, along with waterhole removal, would force the population of sheep to utilize a smaller area, thus creating more stressful conditions and potentially impacting the health of the sheep. Stress predisposes sheep to diseases, and the loss of habitat restricts sheep to smaller areas, thus leading to a greater probability of spreading disease.

A few sheep bedding areas on public (selected) lands will be impacted because they are located within the perimeter of the landfill. Evidence suggests bighorn sheep beds may be used year after year and may be a limiting factor for sheep in an area (Hansen 1980).

Indirect impacts to sheep may occur if the landfill operation causes sheep to alter their use patterns in the habitat surrounding the landfill. Even though sheep are known to habituate to human activity, impacts may occur if sheep perceive landfill activities as harmful and avoid using habitat in the vicinity of the landfill. Although bighorn may remain in areas exposed to human disturbances, the degree of true habituation is not known. These sheep are creatures of habit and will continue to use important resource areas despite disturbance. It is likely that, despite the continued presence of bighorn in impacted areas, they would be under some degree of stress which could affect their susceptibility to disease and their reproductive success (Armentrout, pers. comm., 1990).

Use patterns in the currently disturbed portions of the landfill site will also be altered. Sheep currently cross through disturbed areas

(1,700 acres) as they move within their ranges, and to and from watering holes. Bighorn sheep will move out of the way of intensive landfill operations as they did during mining operations. As the landfill moves from one area of the mine pit to another, the sheep will likely move, utilizing new routes, as they must have done as mining moved to new ore deposits. Indirect impacts due to stress are likely to occur to sheep that use these disturbed portions of the landfill project.

Indirect impacts to sheep may occur with increased residential uses from the addition of over 150 employees to the vicinity of the project. Increased human activity and domestic pets are known to harass or stress sheep (Armentrout, pers. comm., 1990). Poaching could also increase due to the increased number of people in the area. If employees raise domestic livestock, impacts could occur to sheep by exposing them to livestock-related diseases (Armentrout, pers. comm., 1990). Bighorn sheep will move over 17 miles to investigate domestic sheep (Weaver, pers. comm., 1990), thus possibly exposing bighorn sheep to disease.

c. Black-Tailed Gnatcatcher. The implementation of the project would impact black-tailed gnatcatchers by the removal of nests, potential nesting sites, and foraging habitat. Approximately 994 acres of habitat, mostly on public (selected) lands, would be lost at the Eagle Mountain landfill site. The gnatcatcher uses vegetation in ravines, drainages, and washes found in the mountainous and flat areas of the site. Approximately 644 acres of potential habitat at the landfill site would remain in open space (Figure 14). Because of the abundance of habitat in the vicinity of the landfill site, impacts are not expected to be significant.

d. Raptors. Sensitive resident raptors, including the golden eagle, prairie falcon, long-eared owl, and burrowing owl, potentially use habitat on the site, but would not be significantly impacted. Since only two perching or roosting sites were observed on the site, losses would occur only to a small portion of their foraging habitat, which virtually encompasses the entire desert region. Both residents and migrants could forage over undisturbed desert nearby.

e. Bat Species. Significant impacts would occur to the California leaf-nosed bat at the Eagle Mountain landfill site. This species roosts in the large adit in an area that would be filled in approximately 35 years. The loss of the pond at the bottom of the east pit will not significantly affect this species since the town-site reservoir will continue to provide water. No significant impacts to bats are expected on public (selected) lands.

f. Birds. A small potential exists for a landfill-caused increase in the regional raven population to impact the Eagle Mountain scrub jay. Ravens may prey upon the eggs and young of scrub jays (Hays, pers. comm., 1991). Impacts to the jay from increased raven depredation would be considered significant.

None of the other sensitive resident birds considered to potentially occur on the site would be significantly impacted by the implementation of the project.

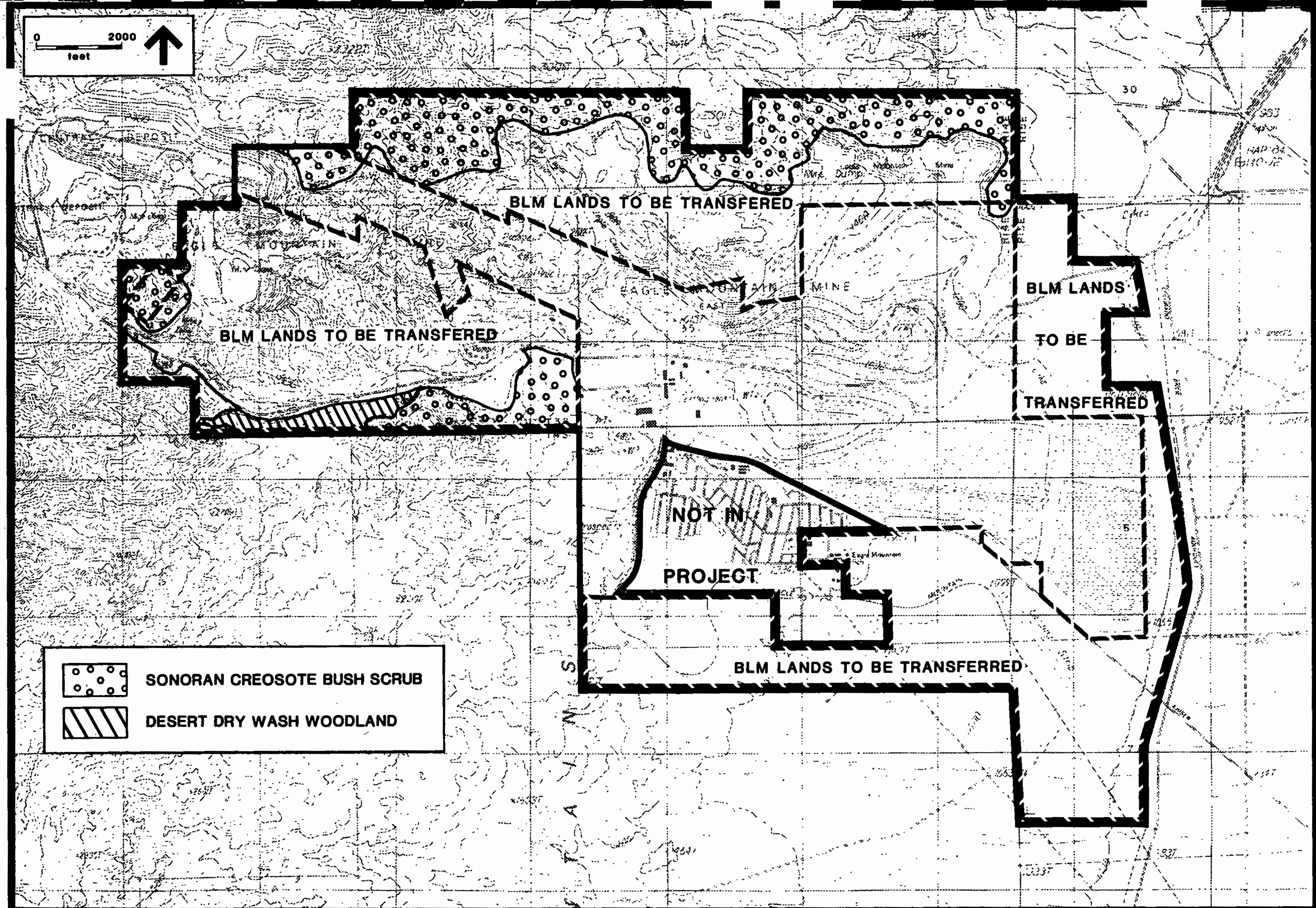


FIGURE 14. PROPOSED NATURAL OPEN SPACE ON THE EAGLE MOUNTAIN LANDFILL PROJECT SITE

RECON

2. Eagle Mountain Railroad Right-of-Way

The following discussion describes potential impacts for the railroad right-of-way portion of the project.

a. Desert Tortoise. Implementation of the project involves the reintroduction of rail service. Desert tortoises currently occupy the habitat immediately adjacent to and sometimes within the railroad bed. Because of this, impacts to desert tortoises could occur with the resumption of maintenance and regular rail service. It has been seven years since the rail line was last in operation.

1) Track Maintenance and Repair. Maintenance and restoration to prepare the rail line for service will consist of minor repairs and replacement of segments of rail and ties, and cleaning out culverts which pass water under the railroad bed. These activities could affect tortoises by burying them in burrows within the rail bed, and burying unoccupied burrows. Unoccupied burrows are an important resource for tortoises because they move from burrow to burrow and use the burrows to escape inclement weather. These potential impacts would be temporary and would occur periodically along approximately 10 miles of railroad through BLM Category 1 tortoise habitat, 18 miles of Category 3, and 24 miles of uncategorized habitat. Monitoring of tortoise burrows within the rail corridor will be necessary before, during, and after repair activities to assess actual impacts.

During rehabilitation and routine maintenance activities along the railroad, the storage of equipment and material, parking of vehicles, and other staging activities will be confined to three currently disturbed sites at Ferrum, Red Cloud, and Summit. Total area of these three sites totals approximately five acres. No current tortoise habitat is anticipated to be impacted from staging activities.

2) Train-kills. Some tortoises may be hit by trains during the course of rail line operations. The frequency of train-kills cannot be accurately determined at this time. Although tortoise sign was observed in small amounts on the tracks, it appears that the berm and tracks form a barrier to tortoises which, while not completely preventing crossover travel, reduces significantly tortoise movements in these areas.

3) Noise. No scientific research has been conducted on the impacts of noise on the desert tortoise. Therefore, some educated assumptions need to be made in evaluating this potential impact. Peterson (1966) conducted a study on hearing capacities in 13 species of lizards, representing 7 families. His conclusions were that the reptilian ear was, in general, less sensitive to sounds and responded to a much narrower range of sound frequencies (400 to 3,000 Hz) than the mammalian ear. Because of its slightly more primitive ear, the wood turtle was found (Peterson 1966) to be even less sensitive to sound than lizards and sensitive to lower frequency sounds (500 to 1,000 Hz). The desert tortoise may respond in a similar manner. However, Peterson also found that those lizards that were more vocal tended to be more sensitive to sounds. The desert tortoise is known to use a variety of vocalizations (Patterson 1976), but whether this has resulted in greater sensitivity to sounds compared to other reptiles is not known.

Bondello et al. (1979) found that the Mojave fringe-toed lizard (*Uma scoparia*) experienced permanent hearing loss when exposed to sound levels of 100 dBL (95 dBA) for a cumulative time of 500 seconds. The maximum sensitivity of this species is in the 1,000 to 1,600 Hz range (Werner 1972). These sound intensity and frequency ranges are assumed to be typical for desert-dwelling lizards. Bondello and Brattstrom (1979) concluded that because of naturally low sound levels and sound attenuation in the hot dry air of desert habitats, desert lizard species were likely to have evolved acute senses of hearing. However, much of the importance of hearing involves prey acquisition and predator avoidance. Neither of these factors is likely as important to the desert tortoise as it is to carnivorous or insectivorous lizards. Herbivorous desert tortoises do not require acute hearing to forage for food, and predator avoidance does not involve a speedy escape, as it does in most lizards, but retreat into a shell. Also, the number of potential predators upon tortoises is considerably smaller than for lizards, except possibly for juvenile tortoises.

Detailed sound sensitivity curves have been determined for three species of tortoises, *Testudo horsfieldi*, *Geochelone carbonaria*, and *Kinixys belliana* (Wever 1978). *T. horsfieldi* was found to have excellent sensitivity in the range from 100-800 Hz and 60 dB. The sensitivity is at 20 dB or better all the way from 50 to 1500 Hz, with a range of 5 octaves. For a tortoise this is a proficient ear, but is poor compared to other vertebrates. For *G. carbonaria* the sensitivity is only fair, with the best frequency range being 80 to 400 Hz. The findings for *K. belliana* were similar to those above, and demonstrate an ear of average to good ability for frequencies of 30 to 600 Hz. In summary, the turtle/tortoise ear is well developed and sensitivity is good, but only in the low frequency range of 100 to 700 Hz.

Trains generate a wide range of sound frequencies caused by the movement of metal wheels over the metal rails, and by the impact of wheels with joints between lengths of rail. The range of sound frequencies expected from the Eagle Mountain railroad is within the 80 to 2,000 Hz range. Turtles and tortoises are sensitive to only a narrow range of frequencies (100-700 Hz) within the sound spectrum created by a passing train. Very low frequency ground vibrations (2-10 Hz) created by the impact of train wheels with rail joints are below the level of sensitivity of the tortoise's ear. These vibrations may be transmitted through the body of the tortoise and may be "heard" indirectly. However, measurements of electrical potentials on the auditory nerve after vibrations were introduced to a turtle's leg showed no response (Wever 1978).

Train noise levels were measured on two separate occasions and at two locations at a distance of 50 feet from Southern Pacific railroad tracks. On May 3, 1990, train noise measurements were taken along tracks in the Whitewater Preserve (for the Coachella Valley fringe-toed lizard), with a recorded maximum dBA of 95. In February of 1990, noise measurements were also taken adjacent to tracks at Corvina Beach, with a recorded peak noise level of 73.7 dBA. The expected noise level of passing trains along the Eagle Mountain railroad will likely fall within this 74 to 95 dBA range at a distance of 50 feet. The train length for each train trip is expected to be approximately 4,000 feet. If a speed of 30 to 40 miles per hour (mph) is anticipated, then maximum noise levels will last 55 to 73 seconds each train trip. With tortoises being inactive for the majority of the 24-hour day, it seems highly unlikely that they will experiencc cumulative noise impacts close to 500 seconds per day, the level of possible permanent hearing loss.

161

Several tortoise behavior patterns and physiological characteristics would likely help reduce potential noise impacts to tortoises. First, as mentioned previously, tortoises are likely not as sensitive to sounds as other reptiles or humans. Second, tortoises spend much of their time underground, which would greatly reduce the intensities of sound to which they would be exposed. When they are active they tend to be above ground in early mornings and late afternoons and inactive during the hottest portions of the day, at least in summer. Finally, tortoises spend November through February in an inactive state in their burrows and not exposed to significant train noise.

The anatomy and electrophysiology of the tortoise ear, plus tortoise behavior, strongly suggest that the tortoise's auditory sensitivity is confined to a very narrow frequency range and that is has no significant vocalizations or auditory-related behaviors. Little evidence exists to indicate that sound is an important feature in its natural history.

In an attempt to directly answer the question as to whether the desert tortoise is hindered or exluded from utilizing potential habitat along active rail lines, several surveys were conducted along active rail lines, some with traffic levels equal or greater than those planned for the Eagle Mountain rail line leading to the Eagle Mountain landfill site. All rail lines selected for survey were sufficiently removed from highways and roads to preclude their influence on the tortoise populations near the rail lines. On an initial reconnaissance survey in the vicinity of Mojave, California (February 6, 1991), two train rights-of-way were examined for tortoise activity. A 2.5-mile length of the Southern Pacific Railroad tracks between Mojave and Searles was walked, with all tortoise sign recorded up to 100 feet from both sides of the tracks. The surrounding tortoise habitat was of very high quality (Marlow, pers. comm., 1991). The train traffic on this rail line averages 2 trains per day (Waters, pers. comm., 1991). A total of 22 burrows/pallets were recorded along this 2.5-mile transect, with 19 of these being judged active within the past year. Eighteen of the 22 sign records were 40 to 60 feet from the tracks. This distance corresponded to the location of a large dirt berm north of the tracks placed for drainage control.

The second rail line examined was the Atchison Topeka and Santa Fe line between Mojave and Barstow, California. Within a one mile section of this track 11 tortoise burrows, 7 judged recently active, were found in the south face of the 8- to 10-foot tall berm supporting the railroad tracks. This track averages 20 trains per day (Waters, pers. comm., 1991). The surrounding habitat was relatively poor in quality for desert tortoise, with little creosote bush present.

In order to compare desert tortoise activity along an active rail line versus similar habitat away from the effects of the rail line, a set of tortoise burrow transects was run in the eastern Mojave Desert (March 2-3, 1991). The transects were set up along 6 miles of the Union Pacific Railroad tracks running from Barstow to Las Vegas, Nevada. The specific site was between the California-Nevada border and Nipton, California. This rail line averages 20 trains per day (Waters, pers. comm., 1991). All burrows within 30 feet of the tracks were recorded, and their conditions categorized. Burrows were placed in one of four possible categories: (1) Active - evidence of recent use (fresh tracks or scats; (2) Recently Active - no plant growth in the mouth of the burrow, no significant drifting of sand into the burrow mouth, or the presence of windblown trash; (3) Inactive - the presence of plant growth, sand, trash, or spider webs in the burrow mouth; and (4) Deteriorated - significant filling of burrow mouth with sand or collapse of burrow roof. A parallel 30-foot by 6-mile transect was run 0.25 mile west of the rail line in similar habitat. Habitat was creosote bush scrub. Figure 15 shows the results of the survey. A total of 20 tortoise burrows was found along the tracks, most within the track berm, while only 8 burrows were observed along the parallel transect away from the tracks. No active burrows were found due to the time of year of the survey. Tortoises had not yet emerged from their winter dormancy period.

The results of these surveys indicate that the desert tortoise is not excluded from utilizing habitat adjacent to active rail lines. The Eagle Mountain rail line is planned to carry a maximum of 12 train passages per day, well below the traffic levels on the surveyed rail lines discussed above. Circumstantial evidence strongly suggests that noise impacts to tortoises from train activity is not significant. Preliminary evidence suggests that railroad track berms may actually be an attractant to local tortoises because of the good burrowing substrate they provide (e.g., loose soil and vertical digging surface). Increased water runoff along the berm may also support more tortoise forage plants, although this is speculation. In conclusion, no significant noise-related impacts to the desert tortoise are expected from reactivation of the Eagle Mountain railroad.

4) <u>Vibration</u>. Within the Eagle Mountain railroad right-of-way the vibration from passing trains has the possibility of causing the collapse of tortoise burrows. It seems likely that buried tortoises could extricate themselves from most collapsed burrows since they are good diggers. Burrows most likely to collapse from vibration are those that are shallowest, making extrication easier. However, the results of the tortoise burrow survey presented in Figure 15 do not show a higher proportion of deteriorated (i.e., collapsed) burrows in the railroad track berm than in the areas removed from the effects of train-generated vibration. As is the case with noise impacts, there is strong evidence that train-related ground vibrations are not significantly impacting desert tortoises, or excluding them from using habitat along the tracks.

5) <u>Tortoise Population Fragmentation</u>. The reactivation of the railroad is likely to act as a barrier to east-west/west-east tortoise movements. Cross-track movements could be halted or hindered by tortoise deaths from train-kills. Any artificial barrier, such as some form of tortoise-proof fencing, that is installed along the railroad track to prevent tortoises from getting onto the track could aggravate this problem further. A physical barrier could potentially result in significant impacts to the two subpopulations of tortoises west of the tracks, one subpopulation south of I-10 (inhabiting 35,000 acres) and one north of I-10 (inhabiting 42,000 acres). A population viability analysis on the desert tortoise done by Gilpin (1990) in conjunction with the Desert Tortoise Short-Term Habitat Conservation Plan for Las Vegas, Nevada, strongly indicated that a minimum viable population of tortoises requires a population of 20,000 tortoises. At a density of 100 tortoises per square mile, it would be necessary to preserve intact 128,000 acres of contiguous habitat to sustain a viable tortoise population long-term (i.e., 500 years). If the subpopulations west of the Eagle Mountain rail line are permanently isolated and their long-term viability seriously threatened, their loss would be a significant impact. It is believed that population fragmentation could be a potentially serious threat to the desert tortoise.

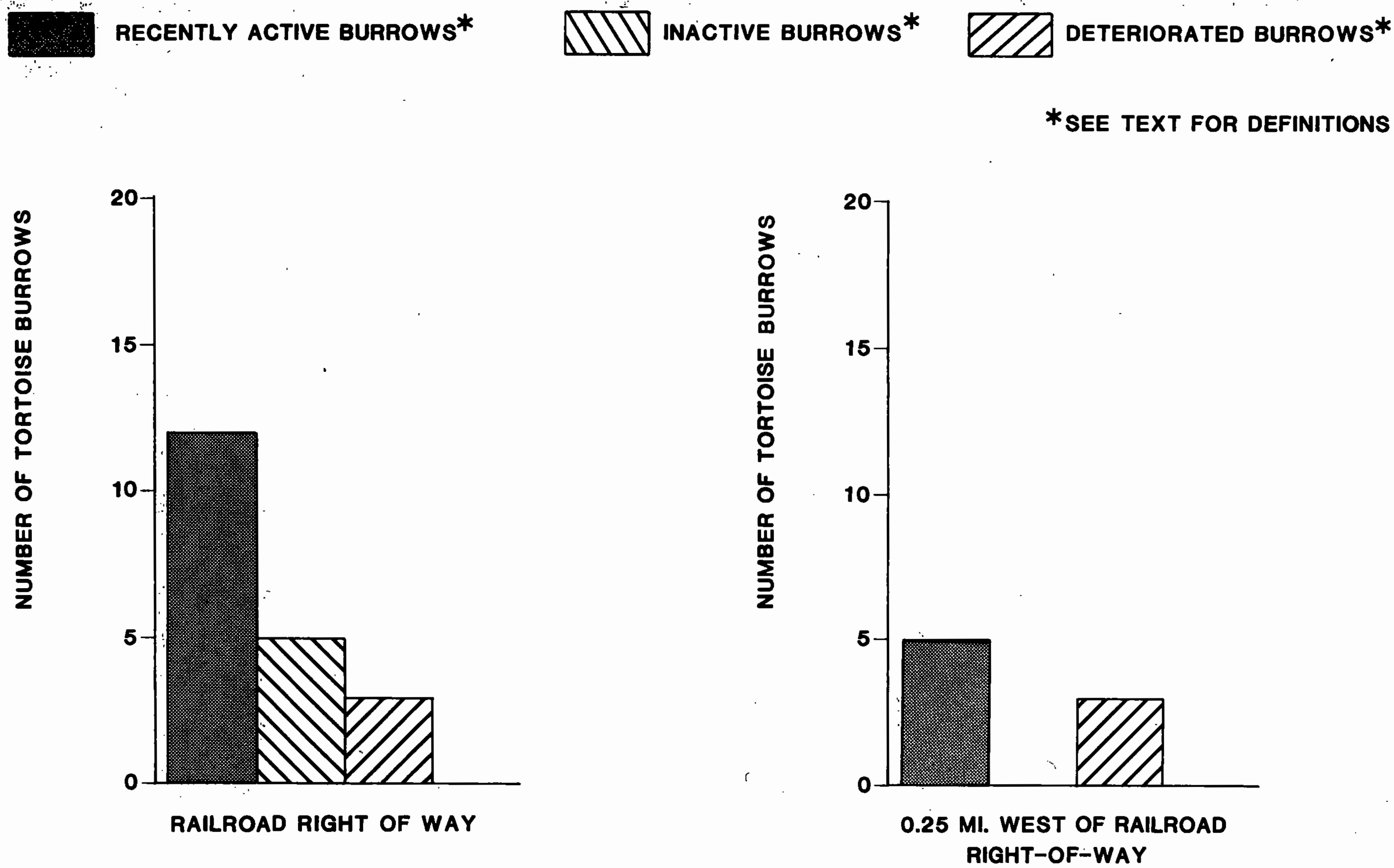


FIGURE 15. COMPARISON OF NUMBER OF DESERT TORTOISE BURROWS ALONG SIX MILES OF UNION PACIFIC RAILROAD WITHIN THE RIGHT-OF-WAY AND APPROXIMATELY 0.25 MILES FROM THE RIGHT-OF-WAY (AVERAGE OF 20 TRAINS PER DAY)

b. Desert Pupfish. Pupfish were observed in Salt Creek tributary in 1982 (Nicol, pers. comm., 1989), a time near the end of several decades of train operations. Although earlier surveys were not intended to specifically assess the effect of the rail operations on the pupfish habitat, it is apparent that the pupfish population continued within the streambed immediately under the railroad trestle for some time. The frequency and length of trains anticipated with the proposed landfill are approximately the same as in the former mining operation. Therefore, few changes are anticipated in the overall quality of the habitat.

Because trash will be fully contained in closed containers and specially designed railcars, no trash will escape during train travel and no impacts are expected to occur to pupfish or their habitat from solid waste discharges during regular use of the railroad. However, direct and uncontrollable impacts may occur to pupfish if there is an accident along the trestle during rail operations. Furthermore, it should be expected that sometime during the 100-year life of the project maintenance or reconstruction of the trestle will become necessary. Major construction activities in the immediate area of pupfish habitat could have a significant impact. Direct kills of fish could occur if they are using habitat under the trestle at that time and if the water and substrate quality were adversely affected by construction. During the fall when water levels are lowest in the Salt Creek system, pupfish populations drop to about 100 individuals. Pupfish losses during this period could be even more critical than at other times of the year.

c. Yuma Clapper Rail. No impacts are anticipated to Yuma clapper rails or their habitat. This species is known to occur within one mile of the rail line, but no appropriate habitat exists within the 200-foot survey corridor for the railroad.

d. California Black Rail. No impacts are anticipated to occur to California black rails. This species occurs in the same general habitat as the Yuma clapper rail and no appropriate habitat exists within the railroad corridor.

e. Nelson's Bighorn Sheep. No impacts are expected to occur to Nelson's bighorn sheep with reimplementation of railroad service. The habitat is not prime sheep range and is a long, narrow strip. Only one case of rail death has been observed in California (Armentrout, pers. comm., 1990; Bleich, pers. comm., 1990) and, therefore, sheep are not expected to be directly injured or killed by moving trains. A significant impact may occur if sheep movement between ranges is disrupted by regular rail operation. Sheep populations in the Chocolate and Orocopia Mountains could be affected by restricted gene flow if the sheep refuse to cross the rail line. No evidence exists to indicate the sheep did not cross the railroad during previous operations and at least one deer trail was observed crossing over the tracks. This incidental evidence suggests that sheep will continue to move over the tracks after reintroduction of rail operations.

f. Flat-Tailed Horned Lizard. Reintroduction of railroad service may affect flat-tailed horned lizards residing within the railroad right-of-way during track maintenance activities. Any impacts to habitat would be small in scale and short-term. The horned lizard may avoid habitat near the railroad due to noise and vibration from passing trains. However, horned lizards use olfactory and visual clues for inter- and intraspecific communication (Tollestrup 1981), which would probably not be as disturbed by train noise as auditory signals could be in other species. Given the general lack of horned lizard habitat in the area these potential impacts would not be significant.

g. American Badger and Burrowing Owl. Implementation of the railroad may affect badgers and burrowing owls if their burrows are destroyed during maintenance. Though no burrowing owls were observed during the survey, they may move into the area during the lifetime of the project. Burrowing owls are especially vulnerable to burrow destruction because they use their burrows for nests as well as roosting sites. Both of these species are quite mobile and would be able to make use of the abundant habitat adjacent to the rail corridor. Impacts to these two species would not be significant.

h. Birds. Vegetation along the railroad provides nesting habitat for small resident birds, including black-tailed gnatcatcher, Bendire's thrasher, LeConte's thrasher, and Crissal thrasher. These species would move into the good-quality habitat surrounding the railroad, and not be significantly impacted.

3. Eagle Mountain Road Improvements, Road Extension, and Railroad Spur

a. Desert Tortoise. Significant impacts to desert tortoise habitat will occur with improvements and widening of the Eagle Mountain Road, and with the building of the extension of Eagle Mountain Road and the rail spur. Eagle Mountain Road will be widened from its current width of 20 feet to 40 feet, within a 110-foot-wide right-of-way. These road improvements will be carried out over a 7-mile length of the right-of-way, from I-10 north. Assuming a worst-case scenario, where the entire right-of-way is disturbed, 76.4 acres of Category 3 tortoise habitat would be lost.

The Eagle Mountain Road extension and rail spur are a continuation of the Eagle Mountain Road 110-foot-wide right-of-way. The proposed 40-foot-wide road extension follows a current 15-foot-wide dirt road for 3.5 miles, and creates a totally new road for 2.5 miles, where it ends at the Phase II handling yard. The new rail spur is also within this proposed 110-foot right-of-way for its final 2.5 miles. Again, assuming that the entire 110-foot right-of-way will be disturbed, a total of 73.6 acres of tortoise habitat would be lost. Therefore, for all road improvements, and road and rail construction, a total of 150 acres of Category 3 desert tortoise habitat would be permanently removed by the project (see Table 6), along with any tortoises residing in this habitat. Although this portion of the project is classified by the BLM as Category 3 desert tortoise habitat, little tortoise sign was seen during the most recent field surveys. The loss of 150 acres of habitat represents a worst-case scenario that assumes that the entire 110-foot-wide right-of-way will be disturbed. Actual impacts are likely to be less.

The projected 12- to 16-hour per day truck traffic along this road would have a significant impact upon the tortoises in the immediate vicinity of the road due to tortoise deaths from road kills. Nicholson (1978) found that on average tortoise density was reduced up to 800 meters from major roadways because of the road kill effect.

An increase in road traffic would cause an increase not only in tortoise road kills, but in the deaths of other wildlife species attempting to cross the road. This has the potential to increase the number of potential tortoise predators, especially the raven, which scavenges road kills. If the number of ravens increases, this could have a significant impact upon the local tortoise population because of the large number of juvenile tortoises ravens may take in the course of foraging for food.

As discussed under the topic of the Eagle Mountain rail line, high traffic flow along the road may act as a barrier to tortoise movement, thus causing population fragmentation and possible extinction of local subpopulations, a significant impact.

b. Nelson's Bighorn Sheep. No significant impacts are expected to occur to Nelson's bighorn sheep due to the implementation of Eagle Mountain Road portion of the project. Bighorn sheep and their sign were not observed along the Eagle Mountain Road corridor during the field surveys. In addition, no movement corridors have been identified for this species in the past in this area. Habitat along Eagle Mountain Road is very sparse, in many places made up of desert pavement, and is not considered good range for bighorn sheep.

c. Other Species of Special Concern. No other species of concern were observed or are expected to occur in the Eagle Mountain Road corridor. No significant impacts are anticipated in the area.

4. Kaiser Steel Resources Properties (Offered Lands)

No significant impacts are anticipated on the Kaiser Steel Resources properties to be traded to the BLM, except possibly indirect impacts (e.g., noise) to the desert tortoise from train operations.

VI. MITIGATION AND COMPENSATION MEASURES

An integral component of the Eagle Mountain Mine landfill project is the commitment to prepare and implement a comprehensive mitigation plan for the entire project. The mitigation plan shall establish the policies and programs for the implementation of a long-term management program for biological resources. The mitigation plan shall be reviewed and updated periodically (for example, every 10 years) to meet changing environmental laws and changes in the status of species. The mitigation plan shall be prepared with the cooperation and approval of USFWS, CDFG, and BLM. This section provides recommendations for mitigation measures which should be incorporated into the mitigation plan. A summary of these measures is provided in Table 7.

As required under Section 7 of the Endangered Species Act (1972) a formal consultation is required between the BLM and the USFWS to assess and mitigate impacts to federally listed threatened and endangered species. The mitigation plan proposed in this EIS will conform to the mitigation outlined in the Biological Assessment for the Eagle Mountain Mine Landfill Project currently being developed.

Mitigation measures will be monitored for implementation and effectiveness. Results of studies and monitoring will be used to modify the mitigation measures to reach the goals of the mitigation plan. Monitoring is consistent with BLM

16

policy to implement monitoring activities that manage renewable resources for long-term viability, assist in evaluation of cumulative impacts to those resources, and evaluate compliance with stipulations contained in BLM decision documents (BLM 1988).

A. GENERAL PROJECT

Mitigation will include measures to avoid impacting natural habitat in the project boundaries. These measures can include placing staging areas for maintenance construction in areas that shall not impact sensitive species or their habitat, discouraging dumping of trash, and preventing off-road-vehicle use and other habitat-disturbing activities.

A worker education program, including on-site workers and contracted truck drivers, will begin before implementation of the landfill operation. The program will emphasize the legal protections afforded sensitive species and measures to minimize impacts to those species and their habitats. The program will include a handbook outlining the details of the protections and measures to be followed. The handbook can include agency addresses and telephone numbers to be used in the case of federally listed species involvement.

During the life of the 115-year project, all new construction, new maintenance construction, and activities that may potentially impact sensitive species will undergo environmental review by a qualified biologist and the appropriate public and private agencies.

B. SITE SPECIFIC

1. Proposed Eagle Mountain Landfill Site

a. Alverson's Foxtail Cactus. Impacts to Alverson's foxtail cactus and its habitat shall be mitigated by initiating a transplant program that will be conducted on suitable areas within the project boundary. This program shall be funded by the project proponent as a sponsored research program that will provide needed information on the rehabilitation of desert habitat using cactus transplants. The transplant program will involve the following steps:

1) Transplant trials shall be conducted on the following areas within the proposed land fill site to determine which areas are most suitable for the establishment of Alverson's foxtail cactus:

   a) Areas of Eagle Creek south of the mining road in locations where minor disturbance has occurred. This site is a portion of Special Planning Area 6 of the Eagle Mountain Landfill Specific Plan.

   b) Locations in lowlands adjacent to drainages on the northwest portion of Special Planning Area 6 where minor disturbances have occurred.

   c) Locations near the foothills of the Eagle Mountains on the upper Bajada area on the northeast portion of Special Planning Area 6.

d) Locations within Special Planning Area 4 where minor disturbances have occurred.

2) Prior to any transplants being taken from their original habitat, the natural density of the population (number of plants/acre) shall be estimated. Estimates of density can be made by counting the number of Alverson's foxtail cactus observed in quadrats along transects across the population. The resulting density figure will be used in the second stage of the transplant program.

3) The initial transplant trials shall utilize 10-15 percent of the Alverson's foxtail cactus population to be impacted by the proposed landfill in Eagle Creek to the north of the mining road. A proportion of the salvaged individuals will be transplanted to each trial habitat area.

4) The transplanted Alverson's foxtail cactus used for the initial trials shall be monitored once a month for one growing season (including a summer). After the trial period is complete, the location(s) having the greatest survivorship will become the site(s) for the completion of the transplant program.

5) Transplanting of Alverson's foxtail cactus, either for the initial planting trials or for the main transplanting effort, shall occur at the most appropriate time of year (late winter/early spring) to take advantage of the rainy season and to increase survivorship of the transplanted material.

6) Sites selected for the main transplant effort shall be planted with the remaining individuals of Alverson's foxtail cactus salvaged from the impact areas of the proposed landfill project at a density similar to that estimated for the natural population (see No. 2 above).

7) The final mitigation areas shall be monitored once a month for one growing season (including a summer) to measure survivorship of the cacti and determine the degree of success of the transplant program.

8) A final report summarizing the results of the transplant program shall be prepared by the project proponent and submitted to BLM, CDFG, and USFWS.

b. Desert Tortoise. To mitigate potential increases in raven populations from the presence of trash, a raven monitoring program will be enacted including one year of preconstruction monitoring. Monitoring shall conform to methodologies outlined by the BLM, and shall be conducted in concert with other raven monitoring programs (e.g., Joshua Tree National Monument) in the CDCA. Monitoring of ravens will continue throughout the life of the landfill project, or until the agencies determine that they are no longer necessary. Should monitoring indicate that the raven population is significantly increasing then an active raven control plan will be implemented immediately and will include one or more of the following control measures: nest destruction, poisoning, shooting, alteration of landfill operations, or any other measures that the responsible agencies deem appropriate. All necessary depredation permits, plus a comprehensive raven management/control program, will be developed and in place before landfill operations begin.

Exposed trash at the landfill site, which could attract ravens, will be minimized by daily burial of all deposited trash. A six-inch covering of dirt/mine tailings will be placed at the end of each work day. If other wildlife species (e.g., coyote, fox) are found to dig out and expose buried trash, thus allowing ravens access to the trash, then fencing will be placed to deny access to the burial sites. Fencing will only be placed if raven monitoring indicates a significant increase in the raven population in the vicinity of the landfill.

In addition to the above mentioned actions, the feasibility of closing the Desert Center landfill is being investigated. This County-operated refuse dump is currently used by ravens, and its closure would remove one local source of food for this species.

c. Nelson's Bighorn Sheep. The potential loss of three permanent water source and one temporary water source is considered a significant impact. As compensation for the loss of the three permanent water sources on-site, three new permanent water sources, ensuring year-round water availability will be constructed. These will be placed away from the mine site to encourage bighorn sheep to use the adjacent natural areas rather than the project site. The sites for the water sources and their design will be located and approved by biologists from the BLM and the CDFG. In addition, as compensation for the loss of one temporary water source, Buzzard Springs will be rehabilitated and cleared of tamarisk. A two-year baseline telemetry study, involving approximately 17 sheep, will be conducted to determine the home ranges of ewes currently using the project site. Ewe home ranges are smaller than those of rams, and ewes show higher fidelity to their home ranges. Thus, ewes do not move as readily as rams. New water sources will be placed in ewe home ranges to facilitate ease of ewes finding these new sources. This change in home range should decrease bighorn stress from landfill operations by luring sheep away from disturbances. New water sources will be placed in habitat at least one year before water sources are removed to enable sheep to habituate to the new water source. Range studies will be conducted to determine if the sheeps' ranges are expanding to include the new water sources. If not, sheep will be translocated to the new water sources to encourage the incorporation of the water sources into their home ranges.

Approximately 644 acres of bighorn sheep habitat will remain as natural open space around the periphery of the landfill project (see Figure 14). Not only will this habitat remain for sheep use, it will also act as a buffer zone between the landfill operation and the relocated sheep population. Virtually all of this proposed preserved habitat is located on public (selected) lands.

Expanding sheep range into areas remote from the landfill will decrease the chance of stress-related illnesses and of contact with potentially toxic substances at the landfill site.

An employee training program will be implemented and should include bighorn sheep habits and habitat needs. This employee awareness program would increase acceptance and knowledge that may help sheep residing near the project. Interested employees can provide useful observation data.

Domestic sheep will be banned from the mine property to prevent disease transmission to bighorn sheep. All dogs will be confined to fenced yards, or otherwise restrained, to prevent harassment of bighorn in the vicinity of the landfill operation. Only authorized individuals will be allowed to possess firearms on the property to assure that no poaching of bighorn occurs.

d. Bat Species. The California leaf-nosed bat population will be monitored during landfill operations prior to initiating activities near the adit. The mouth of the adit will be extended upward using concrete pipe to maintain an eight-foot diameter opening, the current adit dimension, above any landfill deposits, including the level of the final landfill contour. Since the roosting bats are between 250 and 1,300 meters inside the mine tunnel, and the bats are primarily active at times when the landfill operation is not, these bats should not be significantly disturbed (Brown, pers. comm., 1990, and Attachment 1). Other bat species are not expected to be significantly disturbed.

e. Eagle Mountain Scrub Jay. The proposed raven monitoring/control program discussed under desert tortoise mitigation would reduce any potential impacts to scrub jays from the Eagle Mountain landfill project to a level below significance.

2. Eagle Mountain Railroad Right-of-Way

a. Plant Species. Since impacts to the local population of Alverson's foxtail cactus within the rail line right-of-way will involve only a few individual plants, no additional mitigation to that being conducted at the proposed landfill site is necessary.

Mitigation measures for potential impacts to Orocopia sage will include avoidance of these plants by narrowing the disturbance corridor near the population to as small an area as possible. Prior to construction activities in the vicinity of the Orocopia sage populations, an on-site meeting between the construction supervisor and a qualified biologist shall take place to delineate specific areas to avoid and areas where unavoidable impacts can be minimized. This may include flagging individual shrubs for avoidance. Maintenance and construction staging areas will avoid areas containing Orocopia sage populations. Roads should be kept to their current width. Measures should be undertaken to alert employees to avoid off-road travel and other habitat disturbance activities in the areas where Orocopia sage is present.

b. Desert Tortoise. To mitigate and compensate for any potential loss from track maintenance of tortoises inhabiting the 200-foot-wide rail corridor, a preconstruction survey for occupied tortoise burrows will be conducted along each section of railroad track that is repaired. All occupied burrows within 100 feet of the track will be examined for the presence of tortoises and conspicuously marked by a qualified biologist. Any occupied tortoise burrows that collapse during repair and maintenance activities will be immediately excavated, and the tortoise translocated to an artificial burrow no less than 300 feet from the original burrow site (as recommended by the Desert Tortoise Council [1990]). Any above-ground tortoises found within the rail corridor during repair procedures will also be translocated if the on-site biologist believes it is threatened.

Tortoises train-kills will be mitigated for by placing tortoise-proof barriers, in concert with under-track culverts, along the railroad berm in areas of current high tortoise activity. Exact locations of barriers and culvert will be selected in the field with the direction of USFWS, BLM, and CDFG personnel. Several different tortoise barrier and culvert designs could be initially placed along the railroad corridor to study the effectiveness of the different designs. It is believed that the entire rail corridor should not be fenced, since this would fragment the tortoise population and be a much more significant impact to the desert tortoise population than the occasional tortoise train-kill. There is no guarantee that tortoises will use culverts under the tracks, so it is critical that they can still cross over the tracks and maintain population integrity. Ballast will also be placed between the tracks at intervals along the portions of the rail line without barriers to aid the escape of any tortoises caught between the tracks.

A long-term tortoise population monitoring program will be instituted that will monitor changes in tortoise populations as the project proceeds. This will include one year of preconstruction monitoring. Monitoring will be conducted in the immediate vicinity of the Eagle Mountain railroad corridor using transects paralleling and at incremental distances from the tracks. Other transects will be conducted in comparable habitat several miles from the rail line so that comparisons in population changes can be made. The monitoring program will show whether there are any long-term effects on the tortoise population from train noise and vibration. Although no noise or vibration-related impacts to desert tortoises are expected from rail line operation, further mitigation/compensation measures may be required should monitoring indicate negative effects.

One or more transects to monitor raven populations will also be conducted near the rail line, so that any negative changes in tortoise populations can be attributed to either natural causes (e.g., respiratory disease), raven predation, or noise. If a decline in tortoise populations beyond the 200-foot-wide rail corridor can be shown to be caused by noise impacts, then further mitigation measures could be necessary, such as, scheduling of train trips to coincide with periods of tortoise inactivity.

To mitigate for potential population fragmentation due to the active railroad acting as a tortoise barrier, existing culverts under the rail line will be cleaned out and repaired in such a way that they provide easy access for tortoises. New culverts may be placed in areas where current tortoise use of the railroad track berm is high. Tortoise-proof barriers placed parallel to the tracks will be oriented to guide tortoises to culverts. During the course of tortoise population monitoring culverts will be checked for evidence of tortoise use.

If culverts prove ineffective in allowing tortoise movements, then a translocation effort may be necessary. This would involve trading a few individual tortoises from each side of the tracks each year in order to exchange genetic material between disjunct populations. The feasibility of this measure has not been tested, however.

c. Desert Pupfish. Mitigation for potential impacts to pupfish habitat include continued monitoring of the pupfish population in the Salt Creek system by CDFG, development of a mitigation program for impacts caused by maintenance activities, and monitoring by a biologist of any emergency cleanup operations. These mitigation measures should be incorporated into Section 7 consultation and DOI Opinion Letter for implementation.

Annual surveys of the pupfish populations and habitat by the CDFG will continue along Salt Creek and its tributary under the train trestle. If train operations affect the habitat, MRC shall be notified and corrective actions should be developed in consultation with USFWS and CDFG. If maintenance of the trestle or railroad in the Salt Creek tributary must occur, mitigation measures shall be incorporated into the project plans to reduce potential impacts to desert pupfish. Plans for construction or major maintenance shall be reviewed by a qualified biologist. If construction is required on the trestle or rails crossing the tributary, construction plans shall include designs and specifications that will avoid impacts to desert pupfish. Storage and staging areas should be placed in locations which will not affect the habitat, and measures to avoid any discharge of pollutants will be incorporated.

In the event any rail accidents occur in the vicinity of desert pupfish habitat, a qualified biologist will be included as a response and cleanup team member. The cleanup operations will be monitored by the biologist so that additional adverse impacts are not incurred by the cleanup operation. Measures to restore the pupfish habitat in Salt Creek and its tributary in the event of an accident will be incorporated as part of the response plan. If an accident causes the loss of the local pupfish population, the habitat will be restocked with pupfish of the same genetic strain from the nearest suitable population. Measures will be incorporated into a Section 7 consultation and DOI Opinion Letter for implementation.

3. Eagle Mountain Road Improvements, Road Extension, and Railroad Spur

a. Plant Species. Impacts to the local population of Alverson's foxtail cactus within the Eagle Mountain Road, road extension, and rail spur rights-of-way will involve only a few individual plants; therefore, no additional mitigation over that being conducted at the proposed landfill site for this species is necessary.

b. Desert Tortoise. Although Eagle Mountain Road did not show many signs of desert tortoise activity, this county-maintained road is located in BLM classified Category 3 tortoise habitat. A preconstruction survey will be conducted by a qualified biologist, and all tortoises within the 150-acre construction zone will be removed to a safe distance (300 feet) in the immediate vicinity. As compensation for the loss of 150 acres of Category 3 desert tortoise habitat, habitat off-site will be purchased and dedicated as permanent open space. Using a BLM compensation formula, a multiplying factor of 2.5 has been calculated (Blymyer, pers. comm., 1991). Therefore, 375 acres (150 acres x 2.5) of desert tortoise habitat will be purchased as compensation for impacts. The exact parcel(s) to be purchased will be selected by the BLM.

To mitigate potential loss of tortoises to road traffic appropriate tortoise-proof barriers will be installed on both sides of Eagle Mountain Road. To allow for exchange of tortoises from one side of Eagle Mountain Road to the other, culverts, at ground level and with dirt floors, and/or bridges, will be placed along the road. Barriers will be aligned to guide tortoises to these undercrossings.

A mandatory local worker education program will begin before implementation of the landfill operation. The program will emphasize the legal protections afforded sensitive species and measures to minimize impacts to those species and their habitats. The program will include a handbook outlining the details of the protections and measures to be followed by each employee. The program will be extended to contracted truck drivers delivering solid waste to the project site, in order to increase awareness of potential desert tortoise occurrence along Eagle Mountain Road and to receive any reports of tortoise sightings or road kills for prompt removal.

The raven population along Eagle Mountain Road will be regularly monitored as part of the project-wide monitoring program. Increased traffic along this road is likely to increase the number of wildlife road kills available to scavenging ravens. If this raven population is found to increase, then an active raven control program will be instituted. An active raven control plan, along with appropriate depredation permits, will be developed and in place before landfill operations begin.

C. KAISER STEEL RESOURCES PROPERTIES (OFFERED LANDS)

No mitigation measures are required for the Kaiser Steel Resources properties.

VII. REFERENCES CITED

American Ornithologists' Union

1982 Thirty-Fourth Supplement to the American Ornithologists' Union Checklist of North American Birds. *Auk* 99(3).

Anderson, S. H.

1983 Yuma Clapper rail Revegetation Plan. U.S. Fish and Wildlife Service, Laramie, Wyoming.

1989 Personal communication. U.S. Fish and Wildlife Service.

Armentrout, Don

1990 Personal communication. Bureau of Land Management, Riverside. February.

Atwood, J. L.

1988 Speciation and Geographic Variation in Black-tailed Gnatcatchers. *Ornithological Monographs* No. 42, American Ornithologists' Union, Washington, D.C.

Berry, K. H. and L. L. Nicholson

1984 The distribution and density of desert tortoise populations in California in the 1970s. In K.H. Berry (Ed.), the status of the desert tortoise (*Gopherus agassizii*) in the U.S. Rept. to USFWS from The Desert Tortoise Council on Order NO. 11310-0083-81.

Berry, K. H., T. Shields, A. P. Woodman, T. Campbell, J. Robertson, K. Bohuski, and A. Karl.
1986 Changes in the desert tortoise populations at the Desert Tortoise Natural Area between 1979 and 1985. U.S. Department of the Interior, Bureau of Land Management, Riverside, California.

Bernard, S. R., and K. E. Brown
1977 Distribution of Mammals, Reptiles and Amphibians by BLM Physiographic Regions and A. W. Kuchler's Associations for the Eleven Western States. BLM Technical Note.

Bleich, Vernon
1990 Personal communication. California Department of Fish and Game, Bishop. February.

Blong, B., and W. Pollard
1968 Summer Water Requirements of Desert Bighorn in the Santa Rosa Mountains, California, in 1965. *California Fish and Game* 54:289-296.

Blymyer, M.
1991 Personal communication. Bureau of Land Management, Palm Springs, California. January 16 and March 14.

Bondello, M.C., A.C. Huntley, H.B. Cohen and B.H. Brattstrom
1979 The effects of dune buggy sounds on the telencephalic auditory evoked response in the Mojave fringe-toed lizard, *Uma scoparia*. Report, Contract No. CA-060-CT7-2737, U.S. Bureau of Land Management, Riverside, California.

Bondello, M.C. and B.H. Brattstrom
1979 Ambient Sound Pressure Levels in the California Desert. Report, Contract No. CA-060-CT7-2737, U.S. Bureau of Land Management, Riverside, California.

Bradstrom, Dr. Bayard
1989 Personal communication. California State University, Fullerton. December 5.

Brown, P.
n.d. Bats of the California Desert Conservation Area. A report submitted to the Bureau of Land Management, California Desert Plan Program, Riverside.

Bureau of Land Management
1980 *California Desert Conservation Area Plan.* Desert District, Riverside.

1988 *Desert Tortoise Habitat Management on the Public Lands: A Rangewide Plan.* Division of Wildlife and Fisheries, Washington, D.C.

Bureau of Reclamation
1989 Biological Assessment; Listed Endangered and Candidate Species; Coachella Canal In-place Lining Project. Ecological Resources Division, Denver, Colorado.

Burge, B. L. and W. G. Bradley
1976 Population density, structure, and feeding habitats of the desert tortoise, *Gopherus agassizii*, in a low desert study area in southern Nevada. pp. 51-74 in Engberg, N.J., S. Allen and R.L. Young (eds.). Proceedings of the 1976 Desert Tortoise Council Symposium, Las Vegas, Nevada.

Burk, J. H.
1977 Sonoran Desert Vegetation. In *Terrestrial Vegetation of California*, edited by M. G. Barbour and J. Major, pp. 869-892. Wiley-Interscience, New York.

California, State of
1980 At the Crossroads: A Report on the Status of California's Endangered and Rare Fish and Wildlife. The Resources Agency, Department of Fish and Game.

1989 California Natural Diversity Data Base. Nongame-Heritage Program, California Department of Fish and Game.

Campbell, B., and R. Remington
1981 Influence of Construction Activities on Water-use Patterns of Desert Bighorn Sheep. *Wildlife Society Bulletin* 9:63-65.

Coombs, E. M.
1979 Food habits and livestock competition with the desert tortoise on the Beaver Dam Slope, Utah. Pp. 132-147 in E. St. Amant (ed.). Proceedings of the 1979 Desert Tortoise Council Symposium, San Diego, California.

Desert Tortoise Council
1990 Desert Tortoise Survey Techniques Workshop. June 2, 1991, Victorville, California.

Dunham, Karen L.
1989 East Salton Sea Material Sites. Caltrans, District 11. January.

Eddleman, W. R.
1989 Biology of the Yuma Clapper Rail in the Southwestern U.S. and Northwestern Mexico. Final Report, University of Wyoming. Interagency agreement 4-AA-30-02060.

Endangered Species Act
1973 Federal Register, 16 U.S.C. Sections 1531-1543 (as amended).

Ernst, C. H. and R. W. Barbour
1972 Turtles of the United States. Lexington, Kentucky: The University of Kentucky Press.

Gilpin, Mike
1990 Minimum Viable Population Consideration for Eastern Mojave Desert Tortoise Populations in Clark County, Nevada. Draft report for Habitat Conservation Plan. University of California, La Jolla.

Hansen, C. G.
1980 Habitat. In *The Desert Bighorn Sheep,* edited by G. Monson and L. Sumner, pp. 64-79. The University of Arizona Press, Tucson.

Hansen, R. M., M. K. Johnson, and T. R. Van Devender
1976 Foods of the desert tortoise, *Gopherus agassizii,* in Arizona and Utah. Herp. 32:247-251.

Hays, L.
1991 Personal communication. Biologist, U.S. Fish and Wildlife Service, Laguna Niguel, California. February 27.

Hohman, J. P., R. D. Ohmart, and J. Schwartzmann
1980 An annotated bibliography of the desert tortoise. Desert Tortoise Council Special Publication No. 1, Long Beach, California.

Holland, Robert F.
1986 Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame-Heritage Program, California Department of Fish and Game. October.

Jaeger, Edmund
1969 *Desert Wild Flowers.* Stanford University Press, Stanford, California.

Jennings, M. R.
1983 An Annotated Checklist of the Amphibians and Reptiles of California. *California Department of Fish and Game* 69(3):151-171.

Jennings, R. D.
1985 Biochemical variation of the desert tortoise; *Gopherus agassizii*. M.S. Thesis. University of New Mexico, Albuquerque, New Mexico.

Jones, J. K., D. C. Carter, H. H. Genoways, R. S. Hoffman, and D. W. Rice
1982 Revised Checklist of North American Mammals North of Mexico. *Occasional Papers of the Museum, Texas Tech University* 80:1-22.

Karl, A. E.
1989 Investigations of the Desert Tortoise at the California Department of Health Services Proposed Low-Level Radioactive Waste Facility Site in Ward Valley, California. U.S. Ecology Report. Sanger, California.

Lee, D. S.
1980 *Atlas of North American Freshwater Fishes.* North Carolina State Museum of Natural History.

1162

Leslie, D. M., Jr., and C. L. Douglas
1980 Human Disturbance at Water Sources of Desert Bighorn Sheep. *Wildlife Society Bulletin* 8:284-290.

Marlow, R.
1991 Personal communication. Adjunct Professor, University of Nevada, Las Vegas, Las Vegas, Nevada. February 6.

McQuivey, R. P.
1978 The Desert Bighorn Sheep of Nevada. Nevada Department of Wildlife, Biology Bulletin No. 6. Reno.

Monson, G.
1980 Distribution and Abundance. In *The Desert Bighorn Sheep,* edited by G. Monson and L. Sumner, pp. 40-51. The University of Arizona Press, Tucson.

Moon, Bob
1990 Personal communication. Joshua Tree National Monument, National Park Service. February 1.

Munz, P. A.
1974 *A Flora of Southern California.* University of California Press, Berkeley.

Nagy, K. A. and P. A. Medica
1986 Physiological ecology of desert tortoises in southern Nevada. Herp. 42(1):73-92.

Nicholson, L.
1978 The Effects of Roads on Tortoise Populations. Riverside, California. Contract No. CA-060-CT8-000024. U.S. Department of the Interior, Bureau of Land Management.

Nicol, Kim
1986 Memorandum, desert pupfish survey, Salt Creek, Riverside County. May 16.

1989 Personal communication. California Department of Fish and Game, Region 5. November.

1990 Personal communication. California Department of Fish and Game, Region 5. February.

Patterson, R.
1976 Vocalization in the Desert Tortoise. In the Desert Tortoise Council Proceeding of 1976 Symposium. Long Beach, California. pp. 77-83.

Peterson, A.T.
1990 Birds of Eagle Mountain, Joshua Tree National Monument, California. West. Birds 21: 127-135.

Peterson, E. A.
1966 Hearing in the Lizard: Some Comments on the Auditory Capacities of a Non-mammalian Ear. Herpetologica 22(3):161-171.

RECON
1990 Short-term Habitat Conservation Plan for the Desert Tortoise in Clark County, Nevada. San Diego, California.

Remsen, Jan
1979 Species of Special Concern: California's Imperiled Birds. *Western Tanager* 45(8):1-8.

Schwartz, O. A., V. C. Bleich, and S. A. Holl
1986 Genetics and the Conservation of Mountain Sheep *Ovis canadensis nelsoni*. *Biological Conservation* 37:179-190.

Smith, J. P., and K. Berg
1988 *Inventory of Rare and Endangered Plants of California*. California Native Plant Society Special Publication No. 1, 4th edition. Sacramento, California.

Spang, E. F., G. W. Lamb, F. Rowley, W. H. Radtkey, R. R. Olendorff, E. A. Dahlem, and S. Slone.
1988 Desert Tortoise Habitat Management on Public Lands, a Rangewide Plan. Division of Wildlife and Fisheries, Bureau of Land Management, Washington, D.C.

Stebbins, Robert C.
1985 *A Field Guide to Western Reptiles and Amphibians*. 2nd ed., revised. Houghton Mifflin Company, Boston.

Tollestrup, K.
1981 The Social Behavior and Displays of Two Related Species of Horned Lizards, *Phrynosoma platyrhinos* and *Phrynosoma coronatum*. *Herpetologica* 37:130-141.

Turner, F. B., P. Hayden, B. L. Burge, and J. B. Roberson
1986 Egg production by the desert tortoise (*Gopherus agassizii*) in California. Herp. 42(1):93-104.

Turner, F. B., P. A. Medica, and C. L. Lyons
1984 Reproduction and survival of the desert tortoise *(Scaptochelys agassizii)* in Ivanpah Valley, California. Copeia 1984:811-820.

U.S. Department of the Interior
1986 National Park Service. Case Incident Record, Joshua Tree National Park. Wildlife Sheep Survey.

Waters, C.
1991 Personal communication. DKS Associates, Santa Ana, California. February 22 and 28.

Weaver, Dick
1990 Personal communication. February 8.

Werner, Y.L.
1972 Temperature effects on inner-ear sensitivity in six species of iguanid lizards. J. Herp. 6(3-4): 147-177.

Wever, E.G.
1978 The Reptile Ear. Princeton University Press, Princeton, New Jersey.

Williams, D. F.
1986 Mammalian Species of Special Concern in California. State of California, Resources Agency, California Department of Fish and Game. Wildlife Management Div. Ad. Rep. 86-1.

Woodward-Clyde Associates
n.d. Plant Site to Victorville/Lugo Devers to Victorville/Lugo. Phase 1 Regional Study. Prepared for Wirth Associates.

ATTACHMENT 1

1770

A SURVEY FOR BATS OF THE EAGLE MOUNTAIN PROJECT SITE
RIVERSIDE COUNTY, CALIFORNIA

Prepared by

PATRICIA E. BROWN, Ph.D.
WILDLIFE BIOLOGIST

658 Sonja Court
Ridgecrest, CA 93555

(619) 375-5518

For

RECON
1276 Morena Boulevard
San Diego, CA 92110

June 27, 1990

INTRODUCTION

A field survey was conducted for sensitive bat species in the area of the Kaiser Eagle Mountain Mine in Riverside County, California, part of which is located in Sections 32 through 34 of Township 3 South, Range 14 East and Sections 1 and 2 of Township 4 South, Range 14 East in the unincorporated area of the County of Riverside, State of California. Although the area consists primarily of abandoned open pit iron mines, two underground mines occur on the property and could provide refugia for bats and other wildlife. Special attention was given to the California leaf-nosed bat (*Macrotus californicus*) and Townsend's Big-eared bat (*Plecotus townsendii*) which are California Department of Fish and Game (CDFG) Species of Special Concern and United States Fish and Wildlife Service (USFWS) Category 2 Candidate Species for Threatened or Endangered Status.

The California leaf-nosed bat is the most northerly representative of the Phyllostomatidae, a predominantly Neotropical family. *Macrotus* neither hibernates nor migrates and remains active all year in the southern deserts, where they inhabit warm, humid mine adits and shafts above the annual mean temperature. The winter roosts selected by *Macrotus* exhibit stable temperatures greater than 28 C and relative humidities above 22%. These mines appear to be located in geothermally-heated rock formations of moderate temperature. Except for the approximately two-hour nightly foraging period, *Macrotus* inhabits a stable warm, tropical environment. (During warmer months, the bats may select a more exposed night roost in which to rest between foraging periods.) Roosts with high temperature and humidity appear to be a limiting factor in the distribution of this species in California, since less than 5% of the mines in the mountains bordering the Colorado River contain *Macrotus*.

Townsend's big-eared bat is basically a cave-roosting species that has moved into man-made caves such as mines and buildings. Unlike many other bats, they are unable to crawl into crevices, and usually roost in exposed areas where they are vulnerable to disturbance. *Plecotus* is quite sensitive to human disturbance, and this appears to be the primary cause of population decline for this species. This bat is colonial during the maternity season, when compact clusters of up to 200 individuals might be found. Maternity roosts form in the spring and remain intact during the summer. Great fidelity exists for a roost site, and if undisturbed the bats will use the same roost for many generations.

In the winter, *Plecotus* hibernate in cool caves and mine tunnels. Hibernation is a critical time for the species, since disturbance which causes arousal may expend energy reserves needed to survive the winter. The hibernation period in the California desert will vary with ambient temperature, but is generally from late November through early March.

METHODS

The survey was conducted from May 25 through 28, 1990. Survey methods consisted of entering mines and buildings during the day, and noting any bats or guano present. If possible bats were captured in hand nets to determine species and reproductive status. Two underground mine workings occur on the project site. The main Kaiser mine was quite extensive with several levels that could be throughly explored. The Black Eagle Mine in the southwest corner consisted of a single shaft without a safe ladder and was not entered. In addition several buried inclined culverts and buildings were surveyed as potential bat roosts. Temperature and humidity readings were taken in those parts of the mines or buildings where bats or guano were found.

Mist nets were placed over the mine entrances to capture bats as they emerged at dusk. These bats were identified as to species, sex and reproductive status. The _Macrotus_ were banded for subsequent individual identification. Recapture data provides information on longevity, movements and roost fidelity.

On two evenings, mist nets were placed over water sources which included a pond at the bottom of an open pit mine and the drinking water reservoir for the mine. A bat detector was used to monitor ultrasonic signals since many species emit distinctive sonar signals. A night vision scope was employed to watch bats flying over the ponds and exiting the mine in order to determine the species and approximate number present.

RESULTS

During the diurnal survey of the main adit, a population of approximately 60 leaf-nosed bats was found in a chamber in the second level about 1300 meters from the entrance. The temperature in this 40 foot high room was 83 F at ground level. No other diurnal roosting areas for this species was found in the mine, although guano and moth wings near the entrance suggest that this area is used for night roosting. After dusk, only 18 bats were observed exiting the mine, and only 2 males were captured in the mist nets set at the entrance. It is possible that the disturbance caused by entering the roost during the day inhibited their nighttime departure. Around the corner from the mine entrance, a concrete structure built into the hill contained a large amount of guano and moth wings. A male _Macrotus_ was captured here approximately 3 hours after dusk. Other night roosts of

Macrotus were found in the two metal culverts just west of the main mill site, and in the long cylindical concrete building at the mill site. This may also be a diurnal retreat during certain times of the year, since the morning after our entrance into the mine, 20 bats were observed, including a male banded the night before at the mine. Of two bats captured in hand nets, one was a male and the other a pregnant female, approximately 3 weeks prior to parturition. It is possible that this is an alternate diurnal retreat that is used only after disturbance in the mine.

In addition to Macrotus guano in the mine, a two-foot diameter circle of Plecotus guano, which is diagnostic of a maternity roost, was found approximately 1000 meters from the entance on the first level. The guano was probably a year old, and no bats of this species were found in the mine.

A male pallid bat (Antrozous pallidus) was captured in the mist net set over the mine pit pond. Although many western pipistrelles (Pipistrellus hesperus) were monitored with the bat detector and observed flying around the nets over the pond and reservoir, none were captured. A Mexican free-tailed bat (Tadarida brasiliensis) was heard flying over the reservoir. A list of bat species which might occur at various times in the project site is given in Table 1.

DISCUSSION

The discovery of the leaf-nosed bat roost in the Kaiser Eagle Mountain mine represents the first record of this species from this mountain range. Most current known roosts are from mines in mountains bordering the Colorado River. A single Macrotus was found in the McCoy Mountains approximately 30 miles to the east by Dr. Brown in March 1989. A single specimen was collected by Grinnell in 1908 in Mecca which is about 50 miles to the southwest, although no roosts are now known from that area. This species roosts in warm mine tunnels, and the Eagle Mountain adit which was abandoned in 1972 fits these requirements. The capture of a pregnant female suggests that this is also a maternity roost. Additional surveys need to be conducted to determine if this is indeed the case, and if Macrotus also inhabits the mine during the winter.

Although no Plecotus were found during this survey, the presence of guano in the circular formation typical of depositions beneath a maternity roost is evidence of past roosting activity. Surveys should be conducted during other times of the year to determine if this sensitive species occurs on the project site.

RECOMMENDATIONS

1. Diurnal survey of the concrete building and culverts to determine if these are used by Macrotus when no disturbance has occurred in the mine adit.

2. Monitor the outflight of the mine adit at dusk and count bats without people previously entering the mine. This should be done in summer and winter.

3. Activity around the mine and concrete building should be curtailed and access to these areas restricted to avoid disturbance to a sensitive bat species.

4. Monitor the Black Eagle Mine at dusk to determine if bats inhabit the shaft.

5. Survey other mines in the Eagle Mountains to determine if the Kaiser adit is the only Macrotus roost in the region.

6. Conduct a survey at different times of the year for Plecotus (in the summer and winter).

TABLE I

1. Order Chiroptera	Bats
Family Phyllostomatidae	Leaf-nosed bats
*Macrotus californicus**	California leaf-nosed bat
Family Molossidae	Free-tailed bats
Tadarida brasiliensis	Mexican free-tailed bat
Nyctinomops femorosaccus	Pocketed free-tailed bat
Eumops perotis	California mastiff bat
Family Vespertilionidae	Plain-nosed bats
*Antrozous pallidus**	Pallid bat
*Plecotus townsendii**	Townsend's big-eared bat
*Pipistrellus hesperus**	Western pipistrelle or canyon bat
Eptesicus fuscus	Big brown bat
Myotis californicus	California Myotis
Myotis yumanensis	Yuma Myotis
Myotis volans	Long-legged Myotis
Myotis thysanodes	Fringed Myotis
Myotis leibii	Small-footed Myotis
Lasionycteris noctivagans	Silver-haired bat
Lasiurus cinereus	Hoary bat
Lasiurus ega	Western yellow bat
Euderma maculatum	Spotted bat

* evidence of presence on project site

Other vertebrates observed during survey 5/26/90 to 5/28/90

Reservoir

Western woodpee (2)
Yellow warbler (2)
Wilson's warbler (2)
Lucy's warbler (2)
Red-spotted toad

Pit at mine bottom

Western flycatcher (2)
Wilson's warbler
House finch (13)
Red-spotted toad

Residential area

Hooded oriole (1)
Black-headed grosbeak (1)
Lucy's warbler (3) breeding
Warbling vireo (1)
Yellow-breasted chat (1)

General in area

Red-tailed hawk
Raven
American kestrel
Turkey vulture

\emorandum

: Fisheries Management, Region 5

Date : May 16, 1986

RECEIVED
DEC 8 1989
RECON

›m : Department of Fish and Game – Kimberly Nicol

bject: Desert Pupfish Survey, Salt Creek, Riverside County

A survey to determine if desert pupfish still occurred in the Salt Creek drainage, Riverside County, was conducted April 29 - May 1, 1986.

Twenty minnow traps baited with cat food were set overnight along Salt Creek from the Hwy. 111 crossing to the mining railroad tresler (Figure 1). Traps were set in depths 10-120 cm. Water temperature ranged from 17 to 33°C, and conductivity ranged from 3,400 - 34,000 umhos.

Seventy pupfish were caught. All pupfish were caught in a 250 m stretch of the creek between the powerline road and the mining railroad tresle, where the creek widens and forms pools with low flows. In these areas algae and detritus were abundant. Other areas in this section, besides where the pupfish were caught, appeared to provide good pupfish habitat but were too shallow to set traps.

Other species caught were mosquitofish (20), sailfin mollies (7), crayfish (27), and freshwater shrimp (8).

Other areas along the creek were not surveyed because an abundant growth of cattails and salt cedar made it impossible to get to the water in the creek.

I would like to thank Darlene McGriff, Patty Young, and Glenn Black of Fish and Game, and Faye Winters from BLM for their assistance in conducting these surveys.

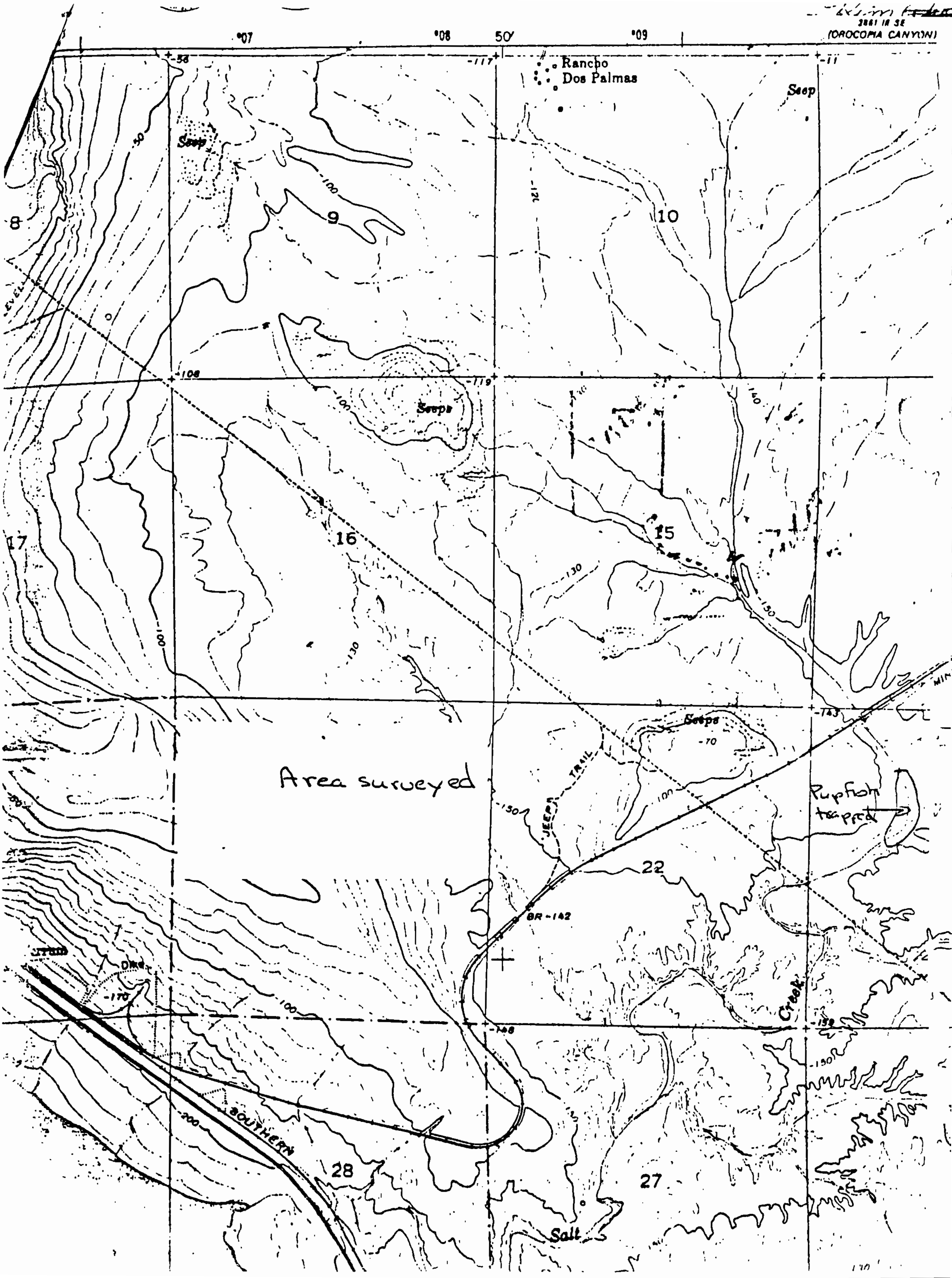
Kimberly Nicol

Kimberly Nicol
Fishery Biologist
Region 5

Attachment

cc: G. Black
D. McGriff
C. Shaw
F. Winters, BLM
R. Bransfield, FWS

KN:dr



(OROCOPIA CANYON)
'07
'08
50'
'09
Rancho
Dos Palmas
Seep
Seep
Seeps
Seeps
8
9
10
15
16
17
22
27
28
Area surveyed
Pupfish trapped
JEEP TRAIL
BR-142
SOUTHERN
Creek
Salt

A WINTER SURVEY FOR BATS OF THE EAGLE MOUNTAIN PROJECT SITE RIVERSIDE COUNTY, CALIFORNIA

Prepared by

PATRICIA E. BROWN, Ph.D.
WILDLIFE BIOLOGIST

658 Sonja Court
Ridgecrest, CA 93555

(619) 375-5518

For

RECON
7460 Mission Valley Road
San Diego, CA 92108

February 15, 1991

INTRODUCTION

A winter field survey was conducted for sensitive bat species in the area of the Kaiser Eagle Mountain Mine in Riverside County, California, part of which is located in Sections 32 through 34 of Township 3 South, Range 14 East and Sections 1 and 2 of Township 4 South, Range 14 East in the unincorporated area of the County of Riverside, State of California. Although the area consists primarily of abandoned open pit iron mines, two underground mines occur on the property that can provide refugia for bats and other wildlife. In a preliminary survey conducted from May 25-28, 1990, the California leaf-nosed bat (Macrotus californicus) was discovered roosting in the main Kaiser Eagle Mountain Mine adit as well as one of the cement buildings on the mill site. Macrotus is a California Department of Fish and Game (CDFG) Species of Special Concern and a United States Fish and Wildlife Service (USFWS) Category 2 Candidate Species for Threatened or Endangered Status.

The discovery of the leaf-nosed bat roost in the Kaiser mine represented the first record of this species from the Eagle Mountains. Most current known roosts are from mines in mountains bordering the Colorado River. Single Macrotus were found in the McCoy Mountains approximately 30 miles to the east by Dr. Brown in March 1989 and December 1990. A single specimen was collected by Grinnell in 1908 in Mecca which is about 50 miles to the southwest, although no roosts are now known from that area. This species roosts in warm mine tunnels, and the Eagle Mountain adit which was abandoned in 1972, fits these requirements. The capture of a pregnant female suggested that this is also a maternity roost. Additional surveys were needed to determine if this is the case, and if Macrotus also inhabits the mine during the winter. To this end, a winter survey was conducted of the mines surveyed during May 1990, as well as mines in the Eagle and Coxcomb Mountains near the proposed project area in an effort to determine if other suitable alternate roosts exist for this species should the Kaiser adit be closed. This survey covered the mines found in the Eagle Mountains between Range 13 East and 15 East and between Township 2 South and 5 South, and in the Coxcomb Mountains within Range 16 East and Township 2 South . Since many of these areas are not adequately surveyed by USGS, section information is not available.

The California leaf-nosed bat is the most northerly representative of the Phyllostomatidae, a predominantly Neotropical family. Macrotus neither hibernates nor migrates and remains active all year in the southern deserts, where they inhabit warm, humid mine adits and shafts above the annual mean temperature. The winter roosts selected by Macrotus exhibit stable temperatures greater than 28 C and relative humidities above 22%. These mines appear to be located in geothermally-heated rock formations of moderate temperature. Except for the approximately two-hour nightly foraging period in the winter, Macrotus inhabits a stable warm, tropical environment. (During warmer months, the bats may select a more exposed night roost in which to rest between foraging periods.) Roosts with high temperature and humidity appear to be a limiting factor in the distribution of this species in California, since less than 5% of the mines in the mountains bordering the Colorado River contain Macrotus. During the late spring and summer, maternity roosts form near mine entrances where temperatures are now warm. This provides ready access for the mother to the young, when she returns to nurse them between nightly foraging bouts.

During this survey, special attention was paid for any evidence of Townsend's big-eared bat (Plecotus townsendii) which is also a CDFG Species of Special Concern and a USFWS Category 2 Candidate Species for Threatened or Endangered Status. Townsend's big-eared bat is basically a cave-roosting species that has moved into man-made caves such as mines and buildings. Unlike many other bats, they are unable to crawl into crevices, and usually roost in exposed areas where they are vulnerable to disturbance. Plecotus is quite sensitive to human disturbance, and this appears to be the primary cause of population decline for this species. This bat is colonial during the maternity season, when compact clusters of up to 200 individuals might be found. Maternity roosts form in the spring and remain intact during the summer. Great fidelity exists for a roost site, and if undisturbed the bats will use the same roost for many generations. In the winter, Plecotus hibernate in cool caves and mine tunnels. Hibernation is a critical time for the species, since disturbance which causes arousal may expend energy reserves needed to survive the winter. The hibernation period in the California desert will vary with ambient temperature, but is generally from late November through early March.

METHODS

The winter survey was conducted from December 2 through 7 and 14 through 16, 1990. On December 3, an aerial reconnaissance of the Eagle and Coxcomb Mountains was conducted from a single engine Cessna to pinpoint mine dumps, especially those of mines which were not shown on the topo maps. Ground survey methods consisted of entering mines during the day, and noting any bats or guano present. If possible bats were captured in hand nets to determine sex and reproductive status. Temperature and humidity readings were taken in those parts of the mines or buildings where bats or guano were found, as well as mines over 30 meters long that did not contain evidence of bats.

Mist nets were placed over the mine entrances to capture bats as they emerged at dusk. The Macrotus were banded for subsequent individual identification since recapture data can provide information on longevity, movements and roost fidelity. In the evening outside potential bat roosts, a bat detector was used to monitor ultrasonic signals since many species emit distinctive sonar signals. A night vision scope was employed to watch bats exiting the mines in order to determine the species and approximate number present.

RESULTS

The first question was to determine whether the bats were winter residents of the Eagle Mountains. Two underground mine workings occur on the project site. The main Kaiser mine adit is quite extensive with several levels that can be throughly explored. The bottom level forms a U-shape with two entrances. The Black Eagle Mine in the southwest corner of the project area consists of a single shaft with cross-cuts necessitating entry with a rope to reach the first level at 60 feet, while deeper levels cannot be safely accessed. In addition several buried inclined culverts and buildings were searched in which bats or guano were found during the May survey.

During the May survey of the main adit, a population of approximately 60 leaf-nosed bats was found in a chamber in the second level about 1300 meters from the entrance. The temperature in this 40 foot high room was 83 F at ground level in May and December. In May, no other diurnal roosting areas for this species was found in the mine, although guano and moth wings near the entrance suggested that this area is used for night roosting. During the winter survey, approximately 100 bats were observed in the second level chamber, while 21 bats were seen in a crevice in the ceiling about 800 feet from the entrance on the west side of the U. On December 3, 8 female and 5 male Macrotus were captured in a mist net while exiting the mine at dusk. Using the night vision equipment, 17 bats were observed exiting from the west side and 97 from the east side on December 6.

At the Black Eagle Mine on December 6, only two Macrotus were seen to exit within the hour after dusk. On the evening of December 15, Dr. Berry descended into the shaft to obtain temperature readings, while Dr. Brown observed with the night vision scope from above. At 2000 hours, a Macrotus entered the mine and continued flying down the shaft beyond the 60 foot level. The temperature at the first level was only 69 F and too cool for a roosting site, but the mine is reputed to be 600 feet deep, and so suitable habitat may exist. However, judging by the observations made at dusk, there are few resident bats at this time of year.

No bats were found in the two metal culverts just west of the main mill site, but evidence of large guano deposits suggest a night roost. During May, 20 leaf-nosed bats, including a pregnant female that was captured, were seen in the long cylindrical concrete building at the mill site during the day. In December, no bats were observed there, suggesting that this roost is used only during warmer periods.

Other mines visited in the Eagle Mountains included the Lucky Turkey #2, the Hard Digging Mine, and the Mystery Mine (all within Joshua Tree National Monument), and the Iron Chief, Mission Sweet, Rainbow's End, Storm Jade, Sentinel and Orofino to the south and west of the project site. The Iron Chief Mine is the largest and most extensive of the mines visited, but it was too cool for Macrotus, and only contained some scattered Myotis guano. The Lucky Turkey #2 contained a large amount of Macrotus guano at the rear of the 240 foot adit where a shaft came down from above, suggesting the possibility of a maternity roost in the summer. The 68 F temperature in December would be too cool for a winter roost. Two other unnamed adits located approximately a mile south of the Lucky Turkey #2, each about 150 feet deep with temperatures of 80 F, contained leaf-nosed bat guano, as well as that of the little brown bat (Myotis sp.) and pallid bat (Antrozous pallidus). .No bats were seen at this time. The 30 foot prospect on the hill above the Mission Sweet contained scat of both desert tortoise (Xerobates agassizi) and ringtail cat (Bassariscus astutus).

Only two adits of any extent were found in the Coxcomb Mountains. Located in a canyon on the northeast side of the range within Range 16 East and Township 2 South, they were not named on the topo sheets. The 100 foot adit at the head of the canyon contained no bat sign, while a possibly larger adit at a lower elevation was protected by a locked metal door. Both this entrance and a shaft above it were monitored at dusk, but no bats emerged.

DISCUSSION

As a result of surveys conducted in May and December, it appears that the leaf-nosed bat (Macrotus californicus) is a year-round resident of the Eagle Mountains. Winter roost sites for this species are limited in the California desert since they must be at least 80 F, which is warmer than the majority of mines. At least 100 leaf-nosed bats use the main Kaiser mine adit as a diurnal retreat, while possibly only a few bats inhabit the Black Eagle shaft. These were the only mines where leaf-nosed bats were found in the winter survey.

In the spring and summer, the temperatures in the mines, especially near entrances, is considerably warmer. In May, Macrotus were found in the main Kaiser adit, as well as the pseudo-mine concrete building by the mill site. The possibility exists that this is a maternity roost. The discovery of Macrotus guano in the Blind Turkey #2 adit and two others south of it, suggests that these might also be summer roosts.

Townsend's big-eared bat (Plecotus townsendii) was not encountered on the project site during either the May or December surveys. However, its occurrence cannot be totally ruled out since the Black Eagle was not monitored in May for bat outflights. The guano of the pallid bat (recently added to the list of CDFG Species of Special Concern) was found in the two adits west of the project site. This species roosts in mines and rock crevices and was also mist-netted over the pond in the bottom of the Kaiser pit during the spring survey.

RECOMMENDATIONS

1. Summer surveys of the concrete building and culverts is needed to determine if these are used by Macrotus when no disturbance has occurred in the main mine adit. Also in summer, the outflight of the Kaiser mine adit and the Black Eagle Mine should be monitored at dusk. The Blind Turkey #2 and the two unnamed mine adits where Macrotus guano was found should be checked in the summer to determine if maternity roosts exist in the Eagle Mountains off of the project site.

2. Since the Kaiser adit appears to be the main winter roost for Macrotus in the Eagle Mountains, it is desirable that this roost not be closed as the proposed project proceeds. Since the expected impact would be to cover the entrance with a growing garbage deposit, it might be possible to extend the adit at an angle upward by the addition of a culvert. To determine the effectiveness of this mitigation procedure, long-term monitoring at different seasons should be required. To that end, it is important that baseline values of population size be established based on monitoring over several years previous to the start of the project.

APPENDIX G

MINERAL RESOURCES

AFFECTED ENVIRONMENT

The most significant mineral resources identified in the Eagle Mountain area are precious and base metals and industrial minerals.

Precious Metals

Following suspension of iron ore mining, the open pits and areas along strike, in the footwall, and in the hanging wall of the iron one deposits were examined for precious metals by Kaiser; Pincock, Allen and Holt, Inc.; Homestake Mining Company; Newmont Mining Corporation; the Goldfield Corporation; and Kiewit Mining Company. No precious metals were detected at any of the above locations (personal Communications, 1990a).

Two samples were collected by Kaiser from the discharge point of fine plant tailings into tailings basins 3 and 6. Fire assaying of these samples did not indicate the presence of gold (see Appendix A, samples 384 and 385).

In addition, coarse plant tailings were sampled and analyzed for precious metals. Twenty samples were collected from different locations on the coarse tailings stockpile T-6. These samples were first evaluated by fire assaying at Eagle Mountain. These analyses showed traces of gold in two samples (see Appendix B-1, samples T-6-1 through T-6-20).

To confirm the above results, splits of the original 20 samples were sent to Skyline Labs, Inc. for gold and silver content analyses by atomic absorption. The results did not indicate the presence of gold in any samples; traces of silver were detected in six samples (see Appendix B-2).

Additional splits of the original 20 samples were sent to the Monitor Geochemical Laboratory. Analyses did not indicate the presence of gold in any of the samples; silver was detected in low (uneconomic) concentrations in three samples (see Appendix B-3).

Industrial Minerals

There are no developable industrial minerals within the boundaries of the Eagle Mountain project area, as determined by a field survey (Morton, 1991).

Iron Ore Resources

Approximately 100 million tons of ore has been produced by Kaiser from the Eagle Mountain Mine since 1948 when the first ore was shipped. Ore was processed at Kaiser's Fontana Steel mill. Steel making operations at Fontana became economically unfeasible during 1982 for several reasons, including the import of foreign steel into Southern California, high energy costs, high labor costs, high transportation costs, depressed market conditions, and demands from the U.S. EPA for an additional quarter billion dollars to upgrade air pollution controls at the Fontana plant (Collins, 1982). With closure of the Fontana plant, the Eagle Mountain Mine lost its principal market. The Fontana plant closure, increased mine operating costs, and lower grades of iron forced closure of the Eagle Mountain Mine.

Data regarding geologic iron deposits at the Eagle Mountain Mine in January 1983 (Kaiser Steel Resources, 1990; Personal Communications, 1990b) show that approximately 335 million tons of iron-bearing material grading from 34.7 to 48.5 percent iron exist in nine separate areas at the mine (see Table 1). In addition to net tonnages, Table 1 shows average iron content for each resource area and anticipated iron unit recovery (calculated based on Kaiser's recovery factors at the time of the mine closure).

Of the iron resources at Eagle Mountain, only about 170 million tons (0.45 percent of U.S. reserves) were considered by Kaiser to be economically recoverable at the time of the mine closure (see Table 2).

TABLE 1. EAGLE MOUNTAIN IRON RESOURCES
(As of January 1, 1983)

	Metric Tons	% Fe	Million Units: Total Fe Units	Million Units: Recoverable Fe Units*
Measured Resources				
East Pit	28,431,454	39.7	1,128.7	756.2
East Pit - West Extension	7,177,775	46.7	335.2	224.6
Central - TV Hill	48,061,239	37.3	1,792.7	1,201.1
Central - Main	42,265,029	37.3	1,576.5	1,056.2
Central - West	22,231,617	38.3	851.5	570.5
Black Eagle - North	49,785,843	39.6	1,971.5	1,320.9
Black Eagle - South	11,236,800	40.2	451.7	302.7
Black Eagle - West Extension	1,597,826	38.6	61.7	41.3
Desert Eagle	28,044,000	48.5	1,360.1	911.3
Subtotal	238,831,583	39.9	9,529.6	6,384.8
Indicated Resources				
East Pit	10,639,420	42.4	451.1	302.2
East Pit - West Extension	5,503,346	44.3	243.8	163.3
Central - TV Hill	15,364,944	37.4	574.6	385.0
Central - Main	6,361,767	40.2	255.7	171.3
Central - West	8,536,628	38.5	328.7	220.2
Black Eagle - North	19,401,207	37.8	733.4	491.4
Black Eagle - South	5,058,600	34.7	175.5	117.6

TABLE 1 (continued)

	Metric Tons	% Fe	Million Units: Total Fe Units	Million Units: Recoverable Fe Units*
Black Eagle - West Extension	1,009,008	38.2	38.5	25.8
Desert Eagle	24,826,000	41.1	1,020.3	683.6
Subtotal	96,700,920	39.5	3,821.6	2,560.5
GRAND TOTAL	335,532,503	39.8	13,351.2	8,945.3

* An Fe unit recovery of 67 percent was used based on past plant performance and metallurgical tests on drill core.

TABLE 2. ECONOMICALLY RECOVERABLE RESOURCES AT EAGLE MOUNTAIN MINE IN 1983

Pit	Bene Plant Ore Metric Tons	Bene Plant Ore % Fe	Bene Plant Ore % S	Pellet Plant Ore Metric Tons	Pellet Plant Ore % Fe	Pellet Plant Ore % S	Metric Tons Total Ore	Total Fe Units	% of Total Fe Units	Metric Tons Waste	Metric Tons Total Material	S/R*
East Pit - Alluvial	21,133,604	24.7	0.05	279,169	40.3	0.40	21,412,773‡	5,220,000	8.4	59,783,151	81,195,924	2.79
East Pit - Midsection	2,786,920	47.7	0.18	2,009,851	48.9	0.93	4,796,771	2,312,178	3.6	14,516,376	19,313,147	3.03
East Pit - West Extension	3,577,598	44.2	0.13	3,246,212	50.3	0.73	6,823,810	3,214,143	5.1	33,728,814	40,552,624	4.94
Central	18,882,600	37.7	0.40	45,762,907	37.7	1.38	64,645,507	24,371,356	38.5	139,981,215	204,626,722	2.17
Black Eagle - North	3,947,404	33.5	0.08	31,074,285	39.1	1.76	35,021,689	13,472,426	21.3	123,730,217	158,751,906	3.53
Black Eagle - South	27,896,125	38.8	0.13	9,855,076	38.3	0.82	37,751,201	14,598,191	23.1	172,136,309	209,887,510	4.56
TOTAL	78,224,251	35.0	0.17	92,227,500	38.9	1.41	170,451,751	63,188,294	100.0	543,875,982	714,327,733	3.19

* S/R = Stripping ratio.

‡ Included in the total ore tonnage for the East Alluvial Pit is State-owned ore.

Open pit reserves based on an average stripping ratio of 3:1 exist in six discrete areas at Eagle Mountain. Percentage figures for each area reflect the percentage of the total reserves (resources economically recoverable in 1983). These areas are as follows:

- East Pit - Alluvial. Approximately 21 million metric tons (12.6 percent) of placer deposit.[4]

- East Pit - Midsection. Approximately 4.8 million metric tons (2.8 percent) of lode deposit.[5]

- East Pit - West Extension. Approximately 6.8 million metric tons (4.0 percent) of lode deposit.

- Central Pit. Approximately 65 million metric tons (37.9 percent) of lode deposit.

- Black Eagle - North. Approximately 35 million metric tons (20.5 percent) of lode deposit.

- Black Eagle - South. Approximately 37.7 million metric tons (22.1 percent) of lode deposit.

Approximately 92 million metric tons of iron reserves at Eagle Mountain (or 54 percent of the total open pit reserves at the mine) are magnetite mixed with pyrite. These deposits have an average iron content of 38.9 percent and an average sulfur content of 1.41 percent (see Table 2). Production of marketable concentrates from such crude ore requires a fairly sophisticated flow

---

[4] The placer material consists of discrete particles of high-grade iron-bearing rock in an alluvial (sand or gravel) matrix.

---

[5] Lode is defined as a fissure in rocks that is filled with minerals (i.e., a mineral deposit in consolidated rock). The term is used synonymously with "ore body," "reef," and "vein."

scheme involving mineral jigs, heavy media separation, and magnetic concentration with pelletization.

Similarly, approximately 78 million metric tons of iron reserves at Eagle Mountain (or 46 percent of total open pit reserves at the mine) are mixtures of magnetite and hematite, with small amounts of pyrite. These deposits have an average iron content of 35.0 percent and a sulfur content of 0.17 percent. Production of marketable concentrates from this type of crude ore requires even more sophisticated flow schemes than for magnetite.

In most reserve areas, iron exists in lode deposits which require sophisticated concentrators to produce saleable products. The only exception is the East Pit - Alluvial reserve area, where 21.4 million metric tons of iron reserves is present in placer deposits. Although this reserve area contains the lowest average iron content of any of the reserve areas, the ease with which concentrates could be obtained from this placer material in a relatively unsophisticated concentrator, combined with the relatively low mining costs likely to be experienced in this area, renders the East Pit - Alluvial reserve area a likely site for future mining.

The ore crushing and concentrating facilities at the Eagle Mountain Mine have been dismantled for salvage, and the mining equipment has been sold. In addition, much of the infrastructure required to support the operation was completely abandoned in 1986 with the suspension of mining activities. Consequently, no ore concentrating can presently be performed at the mine.

ENVIRONMENTAL CONSEQUENCES

Proposed Project

Impacts--

Sequence I of landfill operations would conform to the East Pit - Midsection ore reserve area. Landfill development in this area would thus prevent the open pit mining of 4.8 million metric tons (or 2.8 percent) of the remaining mineral reserves at the Eagle Mountain Mine.

Sequence II of landfill operations would take place in the East Pit - West Extension ore reserve area, which contains approximately 6.8 million metric tons (or 4.0 percent) of the remaining mineral reserves. This reserve area, however, has a very high stripping ratio of almost 5 tons of overburden per ton of ore, and is thus considered by Kaiser to be an underground mineral reserve (i.e., not an open pit reserve). Sequence II of landfilling operations would seriously impact such underground mining economically, but not completely preclude it. Landfilling operations conducted in subsequent sequences (i.e., Sequence III and the Final Sequence) would have similar impacts on underground mining potential.

The undeveloped portion of the Central Deposit reserve area, located east of the current Central Pit limits, would be impacted by landfilling operations late in Sequence III (years 36 through 86). This encroachment would prevent the mining of approximately 20.4 million metric tons (or 12 percent) of the open pit reserves at the mine. The remaining 44.6 million metric tons (or 25.9 percent) of the reserves are outside of the project area and thus would not be affected by the landfill project.

The final sequence of landfill operations (i.e., years 85 through 115) would impact the extreme eastern portion of the East Pit deposits (East Pit - Alluvial). These deposits contain approximately 21 million metric tons (or 12.6 percent) of the remaining open pit reserves, primarily as an iron ore placer deposit.

Approximately 72.7 million metric tons (or 42.6 percent) of iron reserves in the Black Eagle North and South reserve areas would be unaffected by the landfill project.

As discussed above, landfill operations would result in the following adverse impacts on recoverable mineral resources contained in the East Pit Midsection, Central Deposit, and East Pit - Alluvial ore reserve areas:

- Loss of access to 4.8 million metric tons of iron reserves located in the East Pit - Midsection (or 2.8 percent of the remaining reserves at the Eagle Mountain Mine), if this reserve area is not mined prior to commencement of landfilling operations.

- Loss of access to an additional 41.4 million metric tons of iron reserves located in the East Pit - Alluvial and Central Pit deposits (or 24.3 percent of the remaining open pit ore reserves at Eagle Mountain) if, this area is not mined prior to the commencement of landfilling operations in each of these areas.

- Loss of most reasonable and economic access to 6.8 million metric tons of underground mineable resources in the East Pit - West Extension, (or 4.0 percent of the mining reserves at Eagle Mountain) if these reserves are not mined prior to commencement of landfilling operations in this area.

Landfill development would have no adverse impacts on currently active exploration and mining activities at Eagle Mountain.

Elemental iron is one of the most plentiful raw materials in the world, constituting about 5 percent of the world's crust by weight (Labys, 1980). Although there are many types of iron-bearing materials, the two most widely distributed are hematite and magnetite. According to the United States Bureau of Mines (U.S. Bureau of Mines, 1991), 1990 world iron ore reserves are estimated to exceed 800 billion metric tons of crude ore[1] containing more than 230 billion metric tons of iron. The largest concentrations of the world's iron ore reserves are in the Soviet Union, Australia, Canada, United States, Brazil, and India (U.S. Bureau of Mines, 1991). Many countries in the world produce iron ore with high iron content[2] (i.e., more than 50 percent), which constitutes a direct-shipping ore[3].

---

[1] The material, as mined in its natural state, is called crude ore.

[2] Grade denotes iron content in the mined material.

[3] If the mined material is sold with only minimal processing or screening, it is called direct-shipping ore.

U.S. iron resources are estimated to be about 110 billion metric tons ore containing approximately 27 billion metric tons of iron (U.S. Bureau of Mines, 1991). Of these resources, only 37.5 billion metric tons (containing 7.09 billion metric tons of iron) are considered to be economically recoverable (Bolis and Bekkala, 1987). Virtually all U.S. iron ore produced requires concentration and pelletization (U.S. Bureau of Mines, 1991).

The landfill operations at the Eagle Mountain Mine would result in the following losses in terms of U.S. iron reserves, if the specified reserves are not mined prior to commencement of landfilling operations:

- East Pit - Midsection Resources. Loss of 4.8 million metric tons or 0.01 percent of U.S. iron reserves.

- East Pit - Alluvial and Central Pit Resources. Loss of 41.4 million metric tons or 0.11 percent of U.S. iron resources.

- East Pit - West Extension. Loss of most reasonable and economic access to 6.8 million tons or 0.02 percent of U.S. iron resources.

Landfill development would have beneficial impacts on open pit mining at Eagle Mountain. Mining at Eagle Mountain is dependent on the availability of rail service over Kaiser's 52-mile rail line. With the suspension of mining activities, use of this rail line was discontinued in 1986. Landfill development would result in reactivation of this rail line, which could also be available for transport of iron ore concentrates or rock products.

Landfill development would share many of the costs that a small mining operation would otherwise bear alone, such as capital and O&M costs for the railroad, haul roads, electrical and water distribution systems, and maintenance and warehousing facilities.

Any future mining activities would, in turn, benefit landfill development. Specifically, overburden and plant tailing would be available to the landfill as cover material. In addition, mining excavations within the perimeter of the landfill would increase the available capacity of the landfill.

Mitigation--

The impacts of landfilling on mineral resources could be satisfactorily mitigated by the sequencing of landfilling operations, which would assure that the most potentially minable iron resources are impacted last. Such sequencing would provide time to recover the iron deposits contained in the Central Deposit and East Pit - Alluvial reserves of Eagle Mountain, if economically justified, prior to their being covered with refuse. However, if these areas are not mined before their respective impacting phases of landfilling commence, access to these resources would be lost.

Loss of access to the iron reserves contained in the East Pit - Midsection would not be mitigated.

Reduced Landfill Operations Alternative

Impacts--

This alternative may potentially result in adverse impacts on the East Pit - Midsection and Central Deposit iron ore reserve areas. The potential impacts are as follows:

- Loss of access to 4.8 million metric tons of iron reserves located in the East Pit - Midsection (or 2.8 percent of the remaining open pit reserves at Eagle Mountain), if this area is not mined prior to commencement of landfill operations.

- Loss of access to an additional 20.4 million metric tons of iron reserves contained in the Central Deposit area (or 12 percent of the remaining open pit reserves at Eagle Mountain), if this area is not mined prior to commencement of landfilling operations in this area.

- Loss of most reasonable and economic access to 6.8 million metric tons (or 4.0 percent) of underground mineable resources in the East Pit - West Extension if this area is not mined prior to commencement of landfilling operations in this area.

This alternative would result in the same beneficial impacts discussed above for the proposed project.

Mitigation--

The same mitigation measures discussed for the proposed project would apply.

Rail Access Only Alternative

Impacts--

This alternative would result in the same impacts as for the proposed project.

Mitigation--

The same mitigation measures discussed for the proposed project would apply to this alternative.

No Project Alternative

Impacts--

If development of the landfill does not occur, no on-site mineral resources will be impacted.

Mitigation--

No mitigation measures will be necessary.

REFERENCES

Bolis, J. L., and J. A. Bekkala. Iron Ore Availability - Market Economy Countries: A Minerals Availability Appraisal. U.S. Bureau of Mines, Information Circular 9128. 1987.

Collins, W. E. Mineral Resources of the Eagle Mountains, Geology and Mineral Wealth of the California Transverse Ranges. South Coast Geological Society. 1982.

Kaiser Steel Resources. Amendment to Reclamation Plan No. 107, Eagle Mountain Iron Ore Mine, Riverside County, California. September 1990.

Labys, W. C. Market Structure, Bargaining Power, and Resource Price Formation. Lexington Books; D. C. Heath and Company. 1990.

Morton, P. K. Mineral Potential Evaluation of Specified Unpatented Lands of Kaiser Steel Resources Proposed to be Traded to the Bureau of Land Management. Draft Report. March 1991.

Personal Communication. Letter from O. J. Anderson, Kaiser Steel Resources, to J. Zbozinek SCS Engineers. November 6, 1990a.

Personal Communication. Letter from O. J. Anderson, Kaiser Steel Resources, to J. Zbozinek, SCS Engineers. November 9, 1990b.

U.S. Bureau of Mines. Mineral Commodity Summaries 1990. January 1991.

APPENDIX A

FIRE ASSAYING OF SAMPLES FROM DISCHARGE POINT OF FINE PLANT TAILINGS INTO TAILINGS BASIN NOS. 3 AND 6 BY KAISER EAGLE MOUNTAIN

By [signature] FIRE ASSAY REPORT Date 9/20/83

ample esig.	Lab No.	Dore Button Weight in grams	Cupelled Au + Ag Bead Weight		Parted Au Weight		Bead - Au Wt. = Ag		AA Analysis oz/ton		AA Analysis % Wt.	
			mg	oz/ton	mg	oz/ton	mg	oz/ton	Au	Ag	Pb	Cu
382	G. Hope	40.5		.065		.055		.01				
383	" "	44.3		.015		Nil		.015				
384	TP 6	44.9		.015		Nil		.015				
385	TP 3	33.5		Nil		Nil		Nil				

APPENDIX B

ANALYSES OF SAMPLES FROM COARSE TAILINGS STOCKPILE T-6 FOR PRECIOUS METALS

Sample Desig.	Lab No.	Dore Button Weight in grams	Cupelled Au + Ag Bead Weight		Parted Au Weight		Bead - Au Wt. = Ag		AA Analysis oz/ton		AA Analysis % Wt.	
			mg	oz/ton	mg	oz/ton	mg	oz/ton	Au	Ag	Pb	Cu
LVL-25				Nil		Nil		Nil				
LVL-26				TRACE <.005		TRACE <.005		Nil				
T-6-1				Nil		Nil		Nil				
T-6-2				Nil		Nil		Nil				
T-6-3				.02		Nil		.02				
T-6-4				Nil		Nil		Nil				
T-6-5				.015		.015		Nil				
T-6-6				.015		Nil		.015				
T-6-7				Nil		Nil		Nil				
T-6-8				Nil		Nil		Nil				
T-6-9				.025		Nil		.025				
T-6-10				.015		Nil		.015				
T-6-11				.02		Nil		.02				
T-6-12				Nil		Nil		Nil				
T-6-13				Nil		Nil		Nil				
T-6-14				Nil		Nil		Nil				
T-6-15				Nil		Nil		Nil				
T-6-16				Nil		Nil		Nil				

APPENDIX B-1

FIRE ASSAYING OF SAMPLES FROM COARSE TAILINGS
STOCKPILE T-6
BY KAISER EAGLE MOUNTAIN

Sample Desig.	Lab No.	Dore Button Weight in grams	Cupelled Au + Ag Bead Weight		Parted Au Weight		Bead - Au Wt. = Ag		AA Analysis oz/ton		AA Analysis % Wt.	
			mg	oz/ton	mg	oz/ton	mg	oz/ton	Au	Ag	Pb	Cu
T-6-17				Nil		Nil		Nil				
T-6-18				Nil		Nil		Nil				
T-6-19				.045		.02		.025				
T-6-20				.015		Nil		.015				

APPENDIX B-2

ANALYSES OF SAMPLES FROM COARSE TAILINGS STOCKPILE T-6 FOR GOLD AND SILVER BY SKYLINE LABS, INC.

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UPU 031
March 26, 1985
SHIPMENT NO. 1
PROJECT NO.: T-6
P.O. NO. 279-68968
PAGE 1 OF 1

KAISER STEEL CORPORATION
Attn: O.J. Anderson
P.O. Box 317
Desert Center, California 92239

Analysis of 20 Pulp Samples

ITEM	SAMPLE NO.	Au (ppm)	Ag (ppm)
1	T-6-1	<.02	<.2
2	T-6-2	<.02	.2
3	T-6-3	<.02	.2
4	T-6-4	<.02	<.2
5	T-6-5	<.02	<.2
6	T-6-6	<.02	<.2
7	T-6-7	<.02	.2
8	T-6-8	<.02	<.2
9	T-6-9	<.02	<.2
10	T-6-10	<.02	<.2
11	T-6-11	<.02	.2
12	T-6-12	<.02	<.2
13	T-6-13	<.02	<.2
14	T-6-14	<.02	<.2
15	T-6-15	<.02	.2
16	T-6-16	<.02	.2
17	T-6-17	<.02	<.2
18	T-6-18	<.02	<.2
19	T-6-19	<.02	<.2
20	T-6-20	<.02	<.2

REGISTERED ASSAYER CERTIFICATE No. 9425 WILLIAM L. LEHMBECK Arizona U.S.A.

William L. Lehmbeck
Manager

APPENDIX B-3

ANALYSES OF SAMPLES FROM COARSE TAILINGS
STOCKPILE T-6 FOR GOLD AND SILVER
BY MONITOR GEOCHEMICAL LABORATORY, INC.

Monitor Geochemical Laboratory, Inc.
P.O. Box 1428 * Hesperia, California 92345 * Phone (619) 244-3481

Certificate of Analysis

E6
CLIENT: KAISER STEEL
ATTENTION: B HENDERICKSON

DATE: 04/12/85
CLIENT PO : 68991
INVOICE NO. : 1074
LAB NO. : 1336
CC: JIM SUTTON

ANALYTICAL METHODS: Ag - Atomic Absorption
Au - Roasted Acid Digestion A.A.

SAMPLE #	R/Acid Au(ppm)	A.A. Ag(ppm)
T6-1	-.05	-0.1
T6-2	-.05	0.2
T6-3	-.05	0.2
T6--4	-.05	-0.1
T6-5	-.05	0.1
T6-6	-.05	-0.1
T6-7	-.05	-0.1
T6-8	-.05	-0.1
T6-9	-.05	-0.1
T6-10	-.05	-0.1
T6-11	-.05	-0.1
T6-12	-.05	-0.1
T6-13	-.05	0.1
T6-14	-.05	-0.1
T6-15	-.05	-0.1
T6-16	-.05	-0.1
T6-17	-.05	-0.1
T6-18	-.05	-0.1
T6-19	-.05	-0.1
T6-20	-.05	-0.1
	20	20

Gayle Glynn
Analyst

*Greater than 1000 ppm reported as percent (Assay)
**Break in numerical sequence

APPENDIX H

NOISE ASSESSMENT FOR THE EAGLE MOUNTAIN WASTE-BY-RAIL AND DISPOSAL SYSTEM COUNTY OF RIVERSIDE

July 17, 1990
Report No. 90-39.b

Prepared for

RECON REGIONAL ENVIRONMENTAL CONSULTANTS
1276 Morena Boulevard
San Diego, CA 92110-3815

Prepared by

Paul H. Dunholter, Principal
Henry Moon
MESTRE GREVE ASSOCIATES
280 Newport Center Drive
Suite 230
Newport Beach, CA 92660-7528
(714) 760-0891

NOISE ASSESSMENT FOR THE EAGLE MOUNTAIN WASTE-BY-RAIL AND DISPOSAL SYSTEM COUNTY OF RIVERSIDE

1.0 INTRODUCTION

The purpose of this report is to assess the potential noise impacts from the proposed Eagle Mountain Waste-By-Rail and Disposal System. The proposed Eagle Mountain Landfill site is a portion of the open pit mine located in the Eagle Mountains in the high desert area of eastern Riverside County. The site is located approximately 10 miles north of Desert Center, about 200 miles east of Los Angeles, and approximately 50 miles west of the Arizona border. The landfill site will occupy approximately 5,270 acres and is bordered by the Pinto Basin on the north, Chuckwalla Valley on the east, Chuckwalla Mountains on the south, and the Eagle Mountains on the west. Adjacent to the mine is the town of Eagle Mountain, built by the Kaiser Steel Corporation for the employees.

The project proposes to use a portion of the Eagle Mountain open pit mine for the land disposal of nonhazardous municipal solid waste generated in Southern California and retrievable storage of recyclables salvaged from municipal wastes. For site access, the project will utilize Kaiser's 52-mile industrial railroad connecting the mine with the Southern Pacific main line at Ferrum, California, and Kaiser's 5-mile road, connecting the mine with Interstate 10 by way of the Eagle Mountain Road.

The development of the Eagle Mountain Landfill site will increase the noise levels along roadways and rail lines that will serve the project. The primary roadways that will be utilized by the project are Interstate 10 Freeway and Eagle Mountain Road. The primary railroad noise source in the area is the Southern Pacific Railroad Line and the Eagle Mountain Rail Line from Ferrum to the Eagle Mountain Landfill.

The project is expected to generate future noise levels on surrounding areas from the loading stations, the rail lines and roadways that will be used as haul routes, and the proposed landfill operations. This report discusses background information on noise and community noise assessment criteria. This is intended to give the reader a greater understanding on noise and the criteria used to assess potential impacts from noise. The study will analyze the noise impact of the operations at the Eagle Mountain Waste-By-Rail and Disposal System site on adjacent land uses and will determine the ultimate noise levels that will exist on the Eagle Mountain Landfill site. This study will also analyze the noise impact of the rail and truck haul routes that will serve the project on adjacent land uses and will determine the ultimate noise levels that will exist along these routes. These levels will then be compared with applicable County/State noise criteria and, if necessary, potential mitigation measures will be suggested.

2.0 BACKGROUND

2.1 Noise Definitions and Assessment Criteria

Sound is technically described in terms of the loudness (amplitude) of the sound and the frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter Scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud; and 20 dBA higher four times as loud; and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Noise level increases of less than 3 dBA are usually not considered significant. A noise level increase of 5 dBA will be readily noticeable to the human observer, although it will not be perceived as dramatically as a 10 dBA change. Examples of various sound levels in different environments are shown in Exhibit 1.

Sound levels decrease as a function of distance from the source as a result of wave divergence, atmospheric absorption, and ground attenuation. The sound wave form travels away from the source, the sound energy is dispersed over a greater area dispersing the sound power of the wave. The interaction of the sound waves with the ground also affects the noise levels. Soft surfaces such as grass are more absorptive than hard surfaces such as concrete where the amount of noise reduction is less. Atmospheric absorption also influences the levels that are received by the observer. The greater the distance traveled, the greater the influence and the resultant fluctuations. The degree of absorption is a function of the frequency of the sound as well as the humidity and temperature of the air. Turbulence and gradients of wind, temperature and humidity also play a significant role in determining the degree of attenuation.

Noise has been defined as unwanted sound and it is known to have several adverse effects on people. From these known effects of noise, criteria have been established to help protect the public health and safety and prevent disruption of certain human activities. This criteria is based on such known effects of noise on people as hearing loss (not a factor with community noise), communication interference, sleep interference, physiological responses and annoyance. Each of these potential noise impacts on people are briefly discussed in the following narratives:

> *HEARING LOSS* is, in general, not a concern in community noise problems. The potential for noise induced hearing loss is more commonly associated with occupational noise exposures in heavy industry or very noisy work environments with long term exposure. The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dBA for 8 hours per day to protect from hearing loss. Noise levels in neighborhoods, even in very noisy airport environments near major international airports, are not sufficiently loud to cause hearing loss.
>
> *COMMUNICATION INTERFERENCE* is one of the primary concerns in environmental noise problems. Communication interference includes speech interference and activities such as watching television. Normal conversational speech is in the range of 60 to 65 dBA and any noise in this range or louder may interfere with speech. There are specific methods of describing speech interference as a function of distance between speaker and listener and voice level. Exhibit 2 shows the percent of sentence intelligibility with respect to various noise levels.
>
> *SLEEP INTERFERENCE* is a major noise concern in community noise assessment and, of course, is most critical during nighttime hours. Sleep disturbance is one of the major causes of annoyance due to community noise. Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages and cause awakening. Noise may even cause awakening which a person may or may not be able to recall. Extensive research has been conducted on the effect of noise on sleep disturbance.

SOUND LEVELS AND LOUDNESS OF ILLUSTRATIVE NOISES IN INDOOR AND OUTDOOR ENVIRONMENTS
(A-Scale Weighted Sound Levels)

dB(A)	OVER-ALL LEVEL Sound Pressure Level Approx. 0.0002 Microbar	COMMUNITY (Outdoor)	HOME OR INDUSTRY	LOUDNESS Human Judgement of Different Sound Levels
130	UNCOMFORTABLY	Military Jet Aircraft Take-Off With After-burner From Aircraft Carrier @ 50 Ft. (130)	Oxygen Torch (121)	120 dB(A) 32 Times as Loud
120 110	LOUD	Turbo-Fan Aircraft @ Take Off Power @ 200 Ft. (90)	Riveling Machine (110) Rock-N-Roll Band (108-114)	110 dB(A) 16 Times as Loud
100	VERY	Jet Flyover @ 1000 Ft. (103) Boeing 707. DC-8 @ 6080 Ft. Before Landing (106) Bell J-2A Helicopter @ 100 Ft. (100)		100 dB(A) 8 Times as Loud
90	LOUD	Power Mower (96) Boeing 737, DC-9 @ 6080 Ft. Before Landing (97) Motorcycle @25 Ft. (90)	Newspaper Press (97)	90 dB(A) 4 Times as Loud
80		Car Wash @ 20 Ft. (89) Prop. Airplane Flyover @ 1000 Ft. (88) Diesel Truck, 40 MPH @ 50 Ft. (84) Diesel Train, 45 MPH @ 100 Ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	80 dB(A) 2 Times as Loud
70	MODERATELY LOUD	High Urban Ambient Sound (80) Passenger Car, 65 MPH @ 25 Ft. (77) Freeway @ 50 Ft. From Pavement Edge, 10:00 AM (76 +or- 6)	Living Room Music (76) TV-Audio, Vacuum Cleaner	70 dB(A)
60		Air Conditioning Unit @ 100 Ft. (60)	Cash Register @ 10 Ft. (65-70) Electric Typewriter @ 10 Ft. (64) Dishwasher (Rinse) @ 10 Ft. (60) Conversation (60)	60 dB(A) 1/2 as Loud
50	QUIET	Large Transformers @ 100 Ft. (50)		50 dB(A) 1/4 as Loud
40		Bird Calls (44) Lower Limit Urban Ambient Sound (40)		40 dB(A) 1/8 as Loud
	JUST AUDIBLE	(dB[A] Scale Interrupted)		
10	THRESHOLD OF HEARING			

SOURCE: Reproduced from Melville C. Branch and R. Dale Beland, Outdoor Noise in the Metropolitan Environment. Published by the City of Los Angeles, 1970, p.2.

Exhibit 1

Examples of Typical A-Weighted Sound Levels

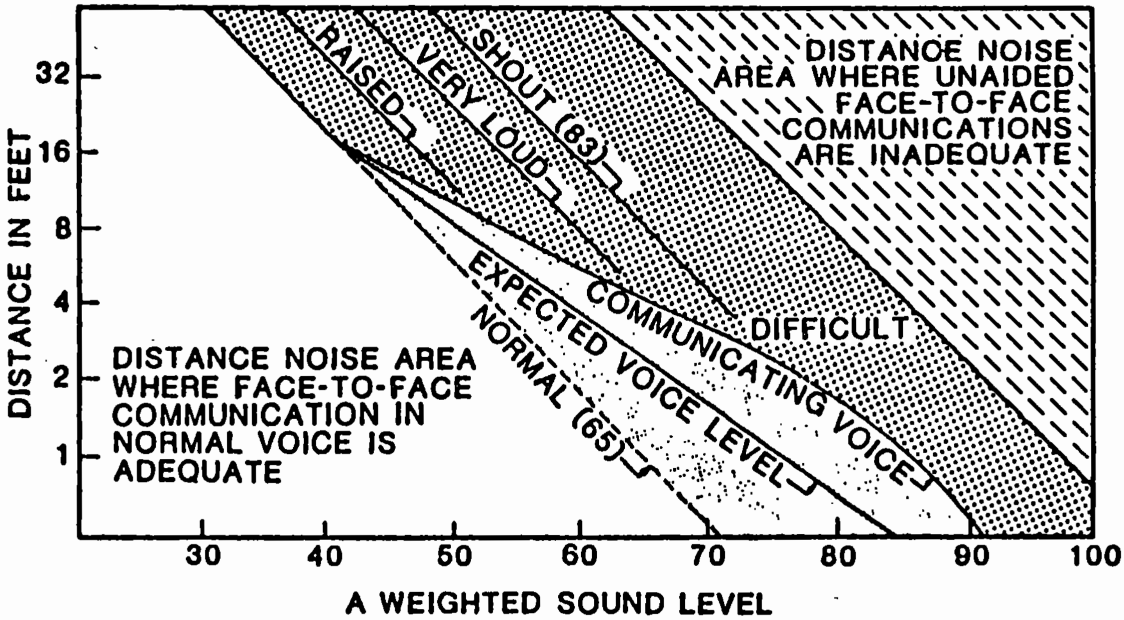


Exhibit 2

Noise and Speech Relationship

Recommended values for desired sound levels in residential bedroom space range from 25 to 45 dBA with 35 to 40 dBA being the norm. The National Association of Noise Control Officials has published data on the probability of sleep disturbance with various single event noise levels. Based on experimental sleep data as related to noise exposure, a 75 dBA interior noise level event will cause noise induced awakening in 30 percent of the cases.

PHYSIOLOGICAL RESPONSES are those measurable effects of noise on people which are realized as changes in pulse rate, blood pressure, etc. While such effects can be induced and observed, the extent is not known to which these physiological responses cause harm or are a sign of harm. Generally, physiological responses are a reaction to a loud short term noise such as a rifle shot or a very loud jet overflight.

ANNOYANCE is the most difficult of all noise responses to describe. Annoyance is a very individual characteristic and can vary widely from person to person. What one person considers tolerable can be quite unbearable to another of equal hearing capability. The level of annoyance, of course, depends on the characteristics of the noise (i.e., loudness, frequency spectra, time, and duration), and how much activity interference (e.g. speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2 to 10 percent of the population is highly susceptible to noise not of their own making, while approximately 20 percent are unaffected by noise. Attitudes are affected by the relationship between the person and the noise source. (Is it our dog barking or the neighbor's dog?) Whether we believe that someone is trying to abate the noise will also effect our level of annoyance.

2.2 Noise Assessment Metrics

The description, analysis and reporting of community noise levels is made difficult by the complexity of human response to noise and the myriad of noise metrics that have been developed for describing noise impacts. Each of these metrics attempt to quantify noise levels with respect to community response. Community noise is generally not steady state and varies with time. Under conditions of non-steady state noise, some type of statistical metric is necessary in order to quantify noise exposure over a long period of time. Several rating scales have been developed for describing the effects of noise on people. They are designed to account for the previously described known effects of noise on people.

2.2.1 Land Use Compatibility Analysis

The predominant rating scales now in use in California for land use compatibility assessment are the Community Noise Equivalent Level (CNEL) and the Day Night Level (Ldn). CNEL represents a time weighted 24 hour average noise level based on the A-weighted decibel. Time weighted refers to the fact that noise that occurs during certain sensitive time periods is penalized for occurring at these times. The CNEL scale penalizes the evening time period (7 p.m. to 10 p.m.) noises by 5 dBA, while nighttime (10 p.m. to 7 a.m.) noises are penalized by 10 dBA. These time periods and penalties were selected to reflect people's increased sensitivity to noise during these time periods. Ldn is similar to CNEL except that the evening time period is not penalized. Typical noise levels in terms of the CNEL scale for different types of communities are presented in Exhibit 3. These scales are commonly used to assess traffic noise impacts.

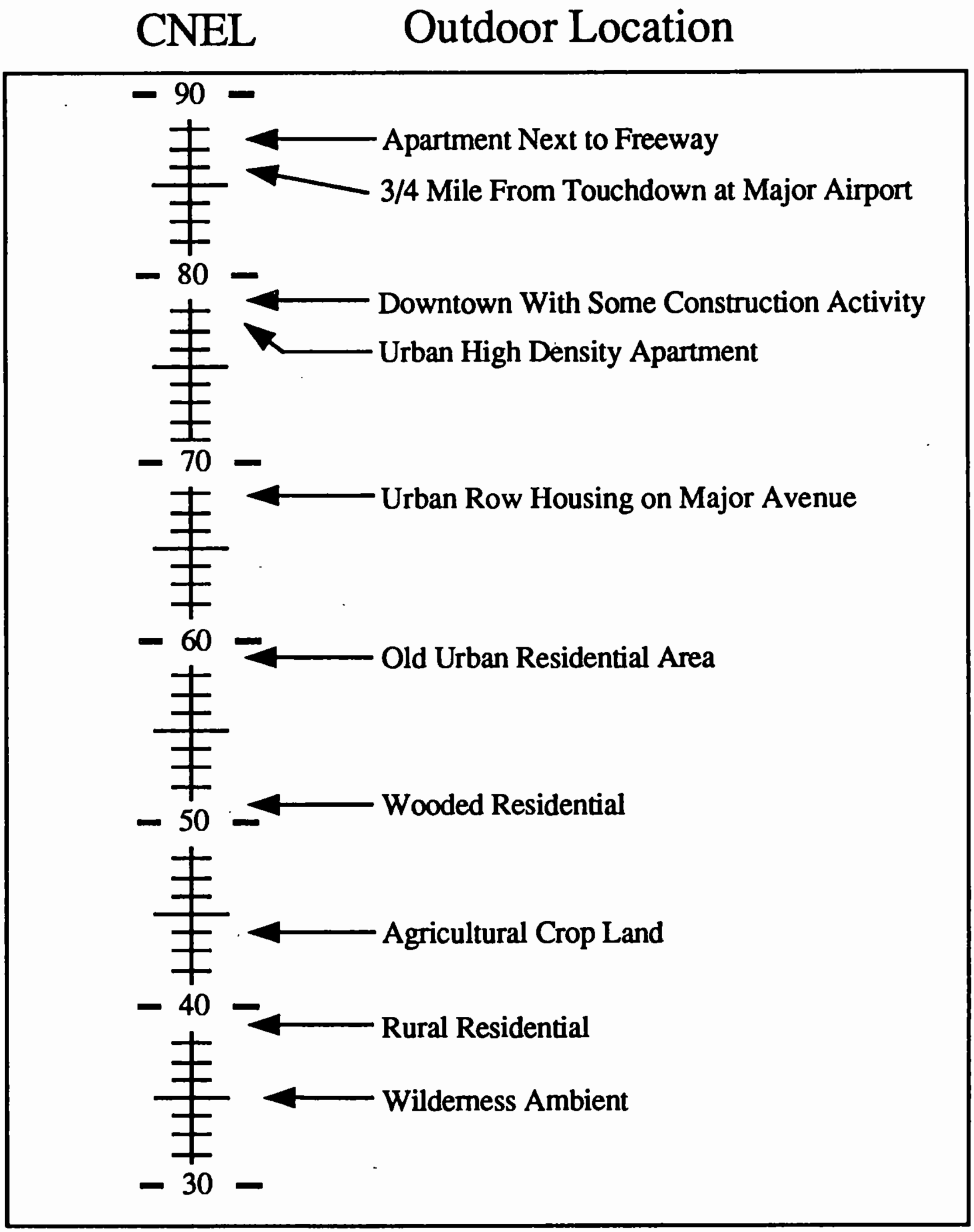


Exhibit 3

Typical Outdoor Noise Levels

State laws passed in the past few years now require that cities develop their Noise Elements in terms of the Ldn or CNEL scales. Both of these scales represent time weighted 24 hour average noise, and correlate much better to how people perceive their noise environment. The California Department of Health has established guidelines for assessing the compatibility of community noise environments and land uses in terms of CNEL. The guidelines rank noise and land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable. These guidelines are summarized in Exhibit 4.

In addition, the California Noise Insulation Standards require that new multi-family residential construction should be noise insulated so that the interior noise levels do not exceed 45 CNEL. Most cities have adopted this standard for both single and multi-family developments along with a 65 CNEL standard for private outdoor living areas (e.g., rear yards and patio areas). These noise criteria are designed to minimize the impacts from transportation noise on residential land uses.

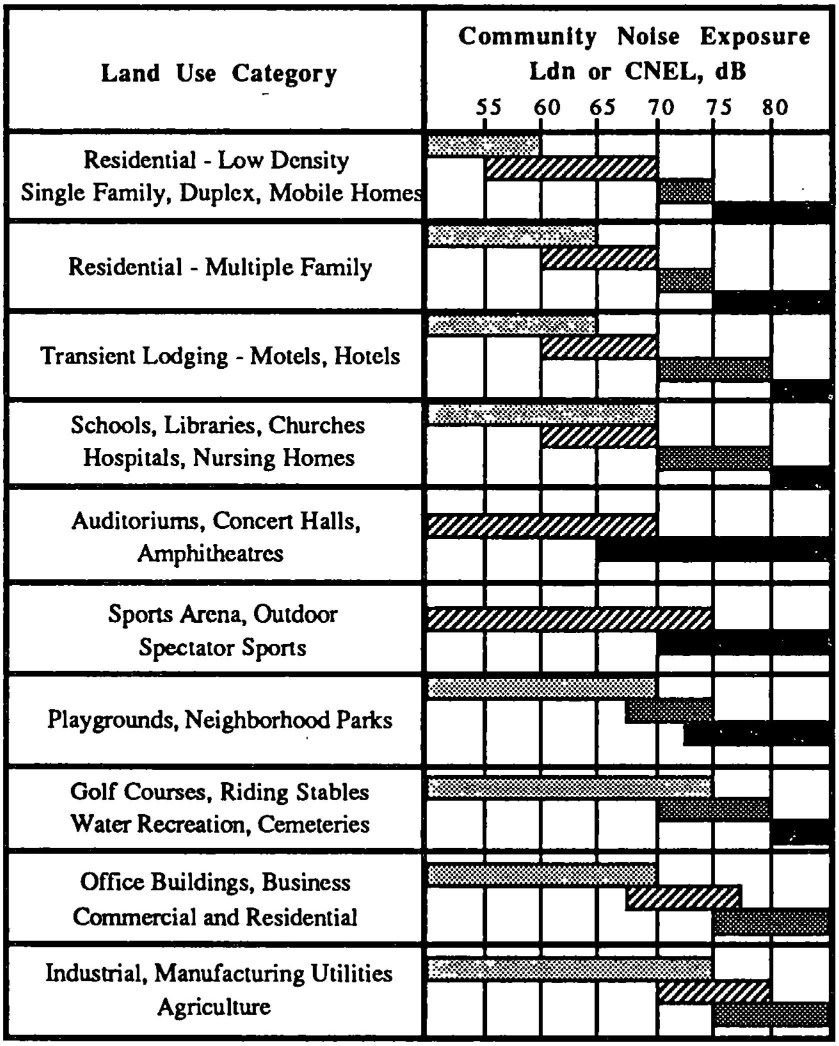
2.2.2 Community Noise Ordinances

Community noise levels are measured in terms of the "A-weighted decibel," abbreviated dBA. Intermittent or occasional noises such as those associated with certain on-site operations are not of sufficient volume to exceed community noise standards that are based on a time averaged scale such as the CNEL scale. A common method of characterizing these noise levels is with the "percent noise level" or L%. The percent noise level describes the noise level which is exceeded during a certain percentage of the measurement period. For example, L50 is the noise level exceeded 50 percent of the time and represents the average noise level. Similarly, L1 is the noise level exceeded 1 percent of the time and represents the peak noise level, L90 is the noise level exceeded 90 percent of the time and represents the background noise level, and Lmax (or L0) is the noise level exceeded 0 percent of the time and represents the maximum noise level.

<u>Riverside County does not have a noise ordinance that would apply to this project.</u> The State of California Department of Health has developed a model noise ordinance that is used to control noise impacts such as the landfill. This model noise ordinance establishes exterior noise standards. The ordinance is designed to protect residential areas from noise sources on private properties. Table 1 presents the noise standards contained in the model noise ordinance. The noise ordinance is designed to control unnecessary, excessive and annoying sounds from stationary sources at the private property line. The noise ordinance requirements can not be applied to mobile noise sources such as heavy trucks when traveling on public roadways. Control of the mobile noise sources on public roads is preempted by federal and State laws. The noise ordinance does not apply to motor vehicles on private property.

Table 1
MODEL NOISE ORDINANCE STANDARDS

MAXIMUM TIME OF EXPOSURE	NOISE METRIC	NOISE LEVEL NOT TO BE EXCEEDED AT THE PROPERTY BOUNDARY 7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
30 Minutes/Hour	L50	50 dBA	45 dBA
15 Minutes/Hour	L25	55 dBA	50 dBA
5 Minutes/Hour	L8.3	60 dBA	55 dBA
1 Minute/Hour	L1.7	65 dBA	60 dBA



Interpretation

Normally Acceptable

Specified Land Use is Satisfactory, Based Upon the Assumption that Any Buildings Involved are of Normal Conventional Construction, Without Any Special Noise Insulation Requirements.

Conditionally Acceptable

New Construction or Development Should be Undertaken Only After a Detailed Analysis of the Noise Reduction Requirement is Made and Needed Noise Insulation Features Included in the Design. Conventional Construction, but with Closed Windows and Fresh Air Supply Systems or Air Conditioning, Will

Normally Unacceptable

New Construction or Development Should Generally be Discouraged. If New Construction or Development Does Proceed, a Detailed Analysis of the Noise Reduction Requirements Must be Made and Needed Noise Insulation Features Included in the

Clearly Unacceptable

New Construction or Development Should Generally not be Undertaken.

Exhibit 4

California Land Use Compatibility Studies

3.0 EXISTING NOISE LEVELS

The existing noise environment was determined through a comprehensive noise measurement survey and computer modeling effort. The noise measurement survey was designed to depict the background noise environment from the adjacent roadways. The existing noise levels were also established in the CNEL index by computer modeling the adjacent roadways for the current traffic characteristics and the railroad for the existing operations.

3.1 Noise Measurement Survey

A noise measurement survey was conducted on December 13th and 14th, 1989 at 10 locations around the proposed landfill site and along rail lines and roadways that will be utilized by the project. The noise measurements were designed to determine the ambient noise environment at the chosen monitoring sites. The noise measurement locations are displayed in Exhibit 5. Measurements were conducted between 10 a.m. and 6 p.m. for a minimum duration of 15 minutes per site. The noise measurements were conducted using a Bruel & Kjaer 2231 digital sound level meter. The system was calibrated before the measurement series.

The results of the ambient noise measurement survey are shown in Table 2. The quantities measured were the equivalent noise level (Leq), the peak noise level (Lmax), and the percent noise levels (L%). Percent noise levels are another method of characterizing ambient noise where, for example, L90 is the noise level exceeded 90 percent of the time, L50 is the level exceeded 50 percent of the time, and L10 is the level exceeded 10 percent of the time. L90 represents the background noise level, L50 represents the average noise level, and L10 represents the dominant noise level.

Table 2
RESULTS OF NOISE MEASUREMENT SURVEY (dBA)

SITE	LOCATION	Leq	Lmax	L10	L50	L90
1	Off Eagle Mtn Rd S of Site	45.9	47.6	46.6	45.6	45.1
2	Eagle Mtn RR crosses I-10	62.7	77.3	66.1	57.1	46.8
3	Chiriaco Rd N of I-10	58.3	68.8	62.1	56.1	51.1
4	Cottonwood Spring Rd N of I-10	56.4	81.7	46.6	30.1	26.6
5	Corvina Beach	54.2	72.2	57.6	41.6	31.1
6	N of Bombay Beach	34.2	38.0	36.6	33.6	30.6
7	Eagle Mtn RR at Coachella Canal Rd	27.2	38.2	30.1	24.1	21.6
8	1/4 mi. N of Eagle Mtn Jr & Sr HS	58.5	82.9	45.6	35.1	32.6
9	Express Way at Yucca	47.9	66.1	40.6	32.6	30.6
10	Corner of Yucca & Palm	49.4	68.1	40.1	35.6	32.2

The noise levels in the above table are due to traffic noise from the Interstate 10 Freeway, aircraft flyovers, and background noise in the area. As mentioned above, the L10 noise levels represent the dominant noise levels. The data in Table 2 shows that the L10 noise levels for sites 2 and 3 were greater than 60 dBA. Sites 2 and 3 were close to roadways and therefore, the dominant noise sources at these sites were due to traffic. Military jet flyovers caused the L10 noise level at site 5 to

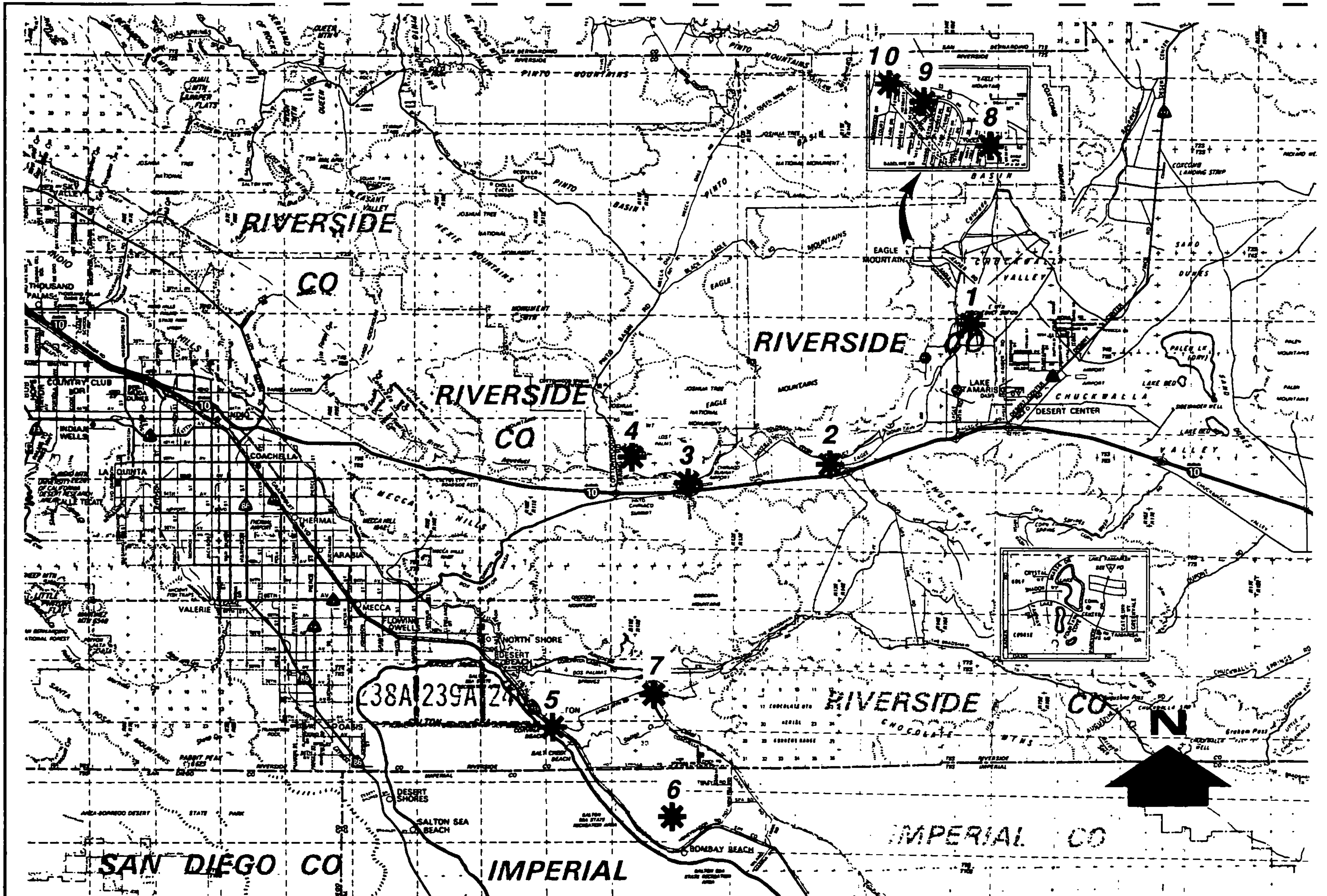


Exhibit 5

Noise Measurement Locations

MESTRE GREVE ASSOCIATES

reach 57.6 dBA. The L10 noise levels at the remainder of the sites were low. The L90 noise level represents the background noise level. The L90 noise levels in Table 2 above shows that the background or ambient noise levels at the monitoring sites were low. The noise sources contributing to the ambient noise levels include distant traffic noise, distant aircraft noise, and wind noise.

3.2 Existing Roadway Noise Levels

The existing traffic noise levels for roadways that will be utilized by the project were established in terms of the CNEL index by modeling the roadways for the current traffic and speed characteristics. The roadways that were modeled for existing conditions were the roadways near to the Eagle Mountain Landfill site and those roadways that may carry project generated traffic. The existing noise environment was modeled in order to establish a baseline noise level to which to compare with the noise environment for the proposed project.

The highway noise levels projected in this report were computed using the Highway Noise Model published by the Federal Highway Administration ("FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108, December 1978). The FHWA Model uses traffic volume, vehicle mix, vehicle speed, and roadway geometry to compute the "equivalent noise level." A computer code has been written which computes equivalent noise levels for each of the time periods used in the calculation of CNEL. Weighting these noise levels and summing them results in the CNEL for the traffic projections used. CNEL contours are found by iterating over many distances until the distance to the 60, 65, and 70 CNEL contours are found.

Traffic data used to project existing noise levels were derived from the traffic study prepared for the EIR (DKS, December 1989). These volumes represent existing daily traffic volumes. The traffic mix for the Interstate 10 Freeway was obtained from CALTRANS data and is specific for this section of the freeway. The traffic mix assumed for the arterial roadways is based on measurements for roadways in Southern California and is considered typical for arterials in this area (OC EMA Traffic Census, 1975). These traffic volumes and assumptions are presented in the Appendix. The distances to the CNEL contours for the roadways in the vicinity of the project are given in Table 3. These represent the distance from the centerline of the road to the contour value shown. These projections do not take into account any barriers, topography, or buildings that may reduce noise levels.

Table 3
EXISTING ROADWAY NOISE LEVELS

ROADWAY	DISTANCE TO CNEL CONTOUR (FEET) 70-CNEL	65-CNEL	60-CNEL
Eagle Mountain Rd			
I-10 EB to I-10 WB	RW	RW	RW
I-10 WB to Ragsdale Rd	RW	RW	RW
N of Ragsdale Rd	RW	RW	RW
Kaiser Rd			
I-10 WB to Ragsdale Rd	RW	RW	43
Ragsdale Rd to Lake Tamarisk Dr	RW	RW	RW
N of Lake Tamarisk Dr	RW	RW	RW
Interstate 10			
Eagle Mountain Rd to Kaiser Rd	148	319	687

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

3.3 Existing Railroad Noise Levels

A Southern Pacific Railroad line runs parallel to Highway 111, south of Interstate 10. Noise measurements made at Site 5 measured a peak noise level from a train operation of 73.7 dBA at approximately 300 feet from the rail line.

The existing train noise levels along the rail line were established in terms of the CNEL index by modeling the railroad for the current operations. To determine train noise levels at various distances the Wyle Model was used ("Assessment of Noise Environments Around Railroad Operations," Wyle Laboratories Report WCR 73-5, July 1973). The noise generated by the train pass-by can be divided into two components; that generated by the engine or locomotive, and that due to the railroad cars. The characteristic frequency of the engine is different than for the cars. The noise generated by the engine is the result of the mechanical movements of the engine parts, the combustion process if the horn is used, and to a lesser extent the exhaust system. The noise generated by the cars is a result of the interaction between the wheels and the railroad track. A zero source height is used for the car noise, and a source height of 10 feet is utilized for the locomotive.

Data on railroad operations were obtained from the Southern Pacific Railroad (Hugh McDowell, June 1988). The railroad line is used only for freight train operations, and 40 trains per day typically pass by the site with an average of 65 cars per train. Five trains will pass by the site during the evening hours and four trains will pass by in the nighttime hours. A speed of 50 miles per hour is typical for the trains. The operational data was utilized in conjunction with the Wyle Model to project train noise levels. The results of the train noise projections are displayed in Table 4 in terms of noise levels at various distances from the tracks. The projections do not include topography or barriers which may reduce the noise levels.

Table 4
EXISTING RAILROAD NOISE LEVELS

DISTANCE (FT)	100	200	300	400	500	700	1000	2000	5000
CNEL (dBA)	74	70	67	64	62	60	57	51	44

In addition to the projections from the Wyle Train Noise Model, train noise measurements were made at the Whitewater preserve between Indian Avenue and the Gene Autry Trail on May 3, 1989 at 50 feet from the Southern Pacific Rail line. The results are shown below in Table 5.

Table 5
WHITEWATER PRESERVE TRAIN
MEASUREMENT RESULTS (50 FT FROM TRACK)

Time	Direction	Maximum dBA	SEL dBA	LEQ(10) dBA	Duration
12:06 PM	East	85	99	71	82 Sec.
1:49 PM	East	95	107	79	133 Sec.
2:42 PM	West	90	105	77	131 Sec.
4:03 PM	East	89	101	73	48 Sec.
5:01 PM	East	90	100	72	142 Sec.
				(Peak 10 min.)	

The measurement data in the above table shows that train pass-bys can reach high maximum noise levels at a distance of 50 feet.

4.0 POTENTIAL NOISE IMPACTS

The potential noise impacts may be separated into four categories; (1) the impact of the sorting and loading facilities on the respective surrounding land uses, (2) the off-site impacts along haul routes due to waste transport via truck and rail, (3) the impact of the operations at the proposed landfill site (which include an unloading station on the premises of the proposed disposal site as well as landfill operations) on the surrounding land uses, and (4) the temporary on-site impacts due to construction noise.

An important part of a noise analysis is the identification of noise-sensitive land uses that may be impacted by the proposed project. This would include any residential properties, schools, or other noise-sensitive land uses adjacent to the project or situated along roadways or railroad lines that will carry project-generated traffic. In the case of the proposed project, the land uses immediate adjacent to the Eagle Mountain Landfill site consist of open space, and some scattered residential development southeast of the landfill site.

4.1 Loading Stations

Mine Reclamation Corporation (MRC) has identified three typical locations for sorting and loading stations in San Gabriel Valley. These three typical sites have been identified only for the purpose of analysis and should not be taken to be fixed or set loading sites. The three sites are located in the eastern half of San Gabriel Valley, south of Interstate 210 and north of Route 60. These three sites are; (1) "Valley Boulevard Site," located on Valley Boulevard in the City of Industry, (2) "Cypress Street Site," located on Cypress Street in the City of Irwindale, and (3) "La Verne Site," located north of Brackett Field in the City of La Verne. The three typical sites identified for the purpose of analysis are all shown in Exhibit 6.

The pieces of equipment that will be operating at the loading stations include scales, front end loaders, compactors, container top handlers, shuttle trucks, conveyors, and sweepers. Noise levels generated by these pieces of equipment may impact noise sensitive land uses near the loading stations. A more detailed analysis of each loading site will be required when final loading stations have been identified and more detailed information of the equipment that will be operating at the loading stations become available. The following paragraphs describe the individual sites in more detail.

4.1.1 Valley Boulevard Site: The Valley Boulevard Site is located in the northeast portion of the City of Industry, east of Brea Canyon Road, between the Southern Pacific and Union Pacific mainlines. The freeway access to the site will be provided via Interstate 10, Route 60, and Route 57. Also, there will be direct access for refuse collection trucks off the extension of Grand Avenue. Direct rail access will be provided by the construction of a spur off the Southern Pacific main line.

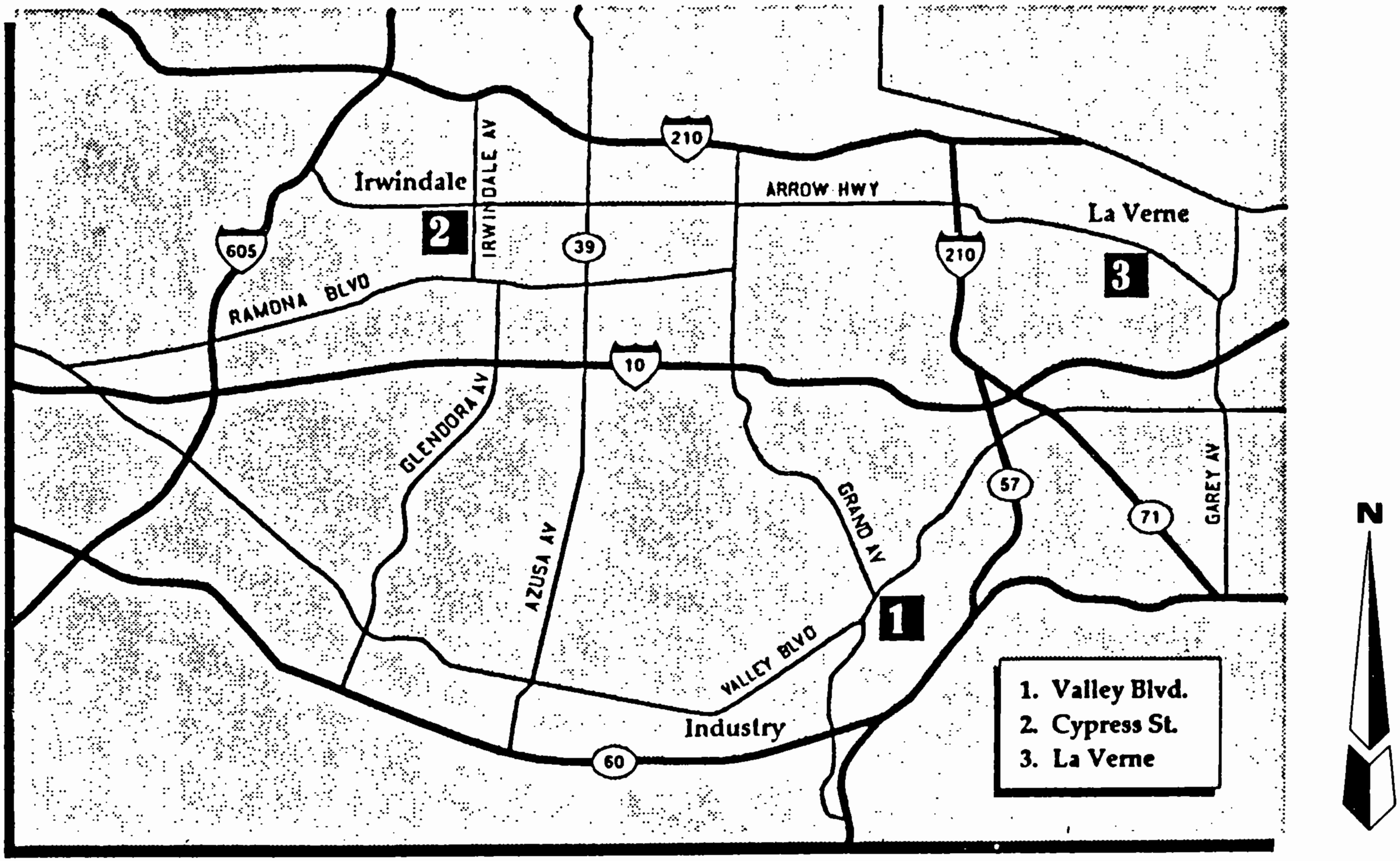
The site is surrounded by industrial developments and several undeveloped parcels. The existing zoning for the site is M Industrial. These land uses are very insensitive to noise and therefore, noise generated from the loading operations at the site should not adversely impact the surrounding areas.

4.1.2 Cypress Street Site: The Cypress Street Site is located in the southern portion of the City of Irwindale, parallel to an existing Southern Pacific rail line. The freeway access to the site will be provided via Interstates 605, 210, and 10. Primary arterials to the site include Irwindale Avenue and Arrow Highway, both of which are truck routes. Also, there will be direct access for refuse collection trucks on an extended driveway off of Cypress Street. Direct rail access will be provided by the existing spur off the Southern Pacific main line.

The existing zoning for the site and the surrounding parcels is M-2 Manufacturing. The property includes four acres of Southern Pacific property (a rail yard) and land in an adjacent parcel that is being developed as an industrial site. This land use of the surrounding areas to the site are very insensitive to noise and therefore, noise generated from the loading operations at the site should not adversely impact the surrounding areas.

4.1.3 La Verne Site: The La Verne Site is located north of Brackett Field and west of the City of Pomona boundary. The freeway access to the site will be provided via Interstates 10, 210, and 605. The major arterial routes to the site include Garey Avenue, Arrow Highway, and Foothill Boulevard. Also there will be direct access for refuse collection trucks along D Street. The Southern Pacific mainline is adjacent to the site, and direct rail access would be provided by construction of a rail spur.

The site is bordered to the east and west by an industrial park. To the south of the site is Brackett Field. To the north of the site, on the north side of the Southern Pacific mainline are residential



MESTRE GREVE ASSOCIATES

Exhibit 6

Proposed San Gabriel Valley Loading Stations areas. The industrial park areas located to the east and west of the site are insensitive to noise as is Brackett Field and therefore, noise generated from the loading operations at the site should not adversely impact the surrounding areas. However, the residential areas north of the site are considered to be noise sensitive land uses and noise from the loading operations may impact these residences. A more detailed study should be undertaken when more detailed plans of the loading facilities and operations are completed.

4.2 Waste Transport Noise

The transportation of the municipal solid wastes to the Eagle Mountain Landfill site will be accomplished by both rail and truck transport. Each are discussed in further detail in the following paragraphs.

4.2.1 Rail Transport

Rail transport will be along the Southern Pacific mainline from the loading stations to Ferrum in Riverside County. At Ferrum, the rail transport will be switched to a private line (Eagle Mountain Rail line) that runs directly to the Eagle Mountain disposal site from Ferrum (approximately 52 miles). For Phase 1, the rail line will run southwest of the Town of Eagle Mountain and terminate at the south edge of the middle pit area. For Phase 2, the rail line will continue up north along the eastern portion of the Eagle Mountain landfill boundary and terminate at the southeast edge of the pit. In conjunction with the Phase 2, a new rail spur will be built that will take off from the Eagle Mountain Rail line southeasterly of the existing landing strip and terminating in the container handling yard. The new spur will be approximately 2 miles long and will carry rail traffic to the eastern portion of the Eagle Mountain Landfill site and away from the town of Eagle Mountain.

It is expected that for Phase 1 of the project, a maximum of 1 train will operate per day in each direction (total of 2 trains for both directions) with 14 cars per train traveling at an average speed of 35 miles per hour. For Phase 2 of the project, a maximum of 6 trains will operate per day in each direction (total of 12 trains for both directions) with 14 cars per train traveling at an average speed of 50 miles per hour. The addition of the project generated train traffic will increase the existing train noise levels along the Southern Pacific Rail line. These noise increases due to the increases in train traffic were determined and are shown below in Table 6.

Table 6
NOISE LEVEL INCREASE ON SOUTHERN PACIFIC RAIL LINE DUE TO PROJECT GENERATED TRAIN TRAFFIC

Distance to CNEL Level	Existing CNEL Level	Project CNEL Level	Existing + Project CNEL Level	Noise Level Increase (dB)
PHASE 1				
100 ft.	74	62.0	74.3	+0.3
PHASE 2				
100 ft.	74	66.6	74.7	+0.7

In community noise assessment, changes in noise levels greater than 3 dBA are often identified as significant, while changes less than 1 dBA will not be discernible to local residents. In the range of 1 to 3 dBA residents who are very sensitive to noise may perceive a slight change. No scientific evidence is available to support the use of 3 dBA as the significance threshold. In laboratory testing situations humans are able to detect noise level changes of slightly less than 1 dBA. However, in a community noise situation the noise exposure is over a long time period, and changes in noise levels occur over years, rather than the immediate comparison made in a laboratory situation. Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dBA, and 3 dBA appears to be appropriate for most people.

As can be seen from the Table 6, the noise level increases of 0.3 dB for Phase 1 and 0.7 dB for Phase 2 that will be experienced by the residential areas assumed to be 100 feet away from the Southern Pacific Rail line is not considered to be significant.

To determine the noise levels due to the Eagle Mountain Rail line that will be utilized for the project between Ferrum and Eagle Mountain, the Wyle Train Noise Model was used to determine train noise levels at various distances. The railroad operations data used were obtained from the Eagle Mountain Waste-By-Rail and Disposal System project description. The noise levels that will be generated by the use of this rail line are shown below in Table 7.

Table 7
PROPOSED EAGLE MOUNTAIN RAILROAD NOISE LEVELS

DISTANCE (FT)	100	200	300	400	500	700	1000	2000	5000
PHASE 1									
CNEL (dBA)	62.0	58.1	54.9	52.7	50.9	48.3	45.6	40.2	33.1
PHASE 2									
CNEL (dBA)	66.6	62.8	59.6	57.3	55.6	53.0	50.2	44.8	37.8

There is currently a return-to-custody facility at the western portion of the Town of Eagle Mountain located approximately 150 feet from the currently unused Kaiser Rail line that will be utilized for Phase 1. This return-to-custody facility lies just outside the Eagle Mountain Landfill project boundary line and may experience noise levels of 60.3 CNEL due to project generated train traffic along the Kaiser Rail line. The train traffic during Phase 2 will be moved to the eastern portion of the landfill site, and will therefore, no longer pass by the return-to-custody facility at the west end of the Town of Eagle Mountain. Also, there may be some residential areas in Ferrum that are approximately 1,000 feet from the rail line. These residential areas in Ferrum will be exposed to train noise levels of 50.2 CNEL.

4.2.2 Truck Transport

The future traffic noise levels were established in terms of the CNEL index by modeling the roadways that will be utilized for the traffic characteristics. The traffic volumes that were used to estimate these noise levels were obtained from the traffic study prepared for this project by DKS

Associates on December 1989 and are summarized in the Appendix. The highway noise levels were computed using the "FHWA Highway Traffic Noise Prediction Model" described earlier. The roadways that were modeled for future plus project conditions were those roadways that may carry project generated traffic. Traffic distribution assumptions are the same as for existing conditions. This traffic data is presented in the Appendix.

The distances to the CNEL contours for the future without project traffic conditions are given in Table 8. They represent the distances from the centerline of the road to the contour value shown. Note that the projections do not take into account the effect of the topography or intervening barriers that will alter ambient noise levels. In addition, existing legislation is expected to reduce noise levels from future vehicles by 3 dBA or more. This reduction is not included in these projections. Table 9 shows the distances to the CNEL contours for the future with project traffic conditions.

Table 8
FUTURE (1995) WITHOUT PROJECT ROADWAY NOISE LEVELS

ROADWAY	DISTANCE TO CNEL CONTOUR (FEET) 70-CNEL	65-CNEL	60-CNEL
Eagle Mountain Rd			
I-10 EB to I-10 WB	RW	RW	RW
I-10 WB to Ragsdale Rd	RW	RW	RW
N of Ragsdale Rd	RW	RW	RW
Kaiser Rd			
I-10 WB to Ragsdale Rd	RW	RW	49
Ragsdale Rd to Lake Tamarisk Dr	RW	RW	RW
N of Lake Tamarisk Dr	RW	RW	RW
Interstate 10			
Eagle Mountain Rd to Kaiser Rd	185	399	860

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

Table 9
FUTURE (1995) WITH PROJECT ROADWAY NOISE LEVELS

ROADWAY	DISTANCE TO CNEL CONTOUR (FEET) 70-CNEL	65-CNEL	60-CNEL
Eagle Mountain Rd			
I-10 EB to I-10 WB	RW	RW	RW
I-10 WB to Ragsdale Rd	RW	RW	RW
N of Ragsdale Rd	RW	RW	RW
Kaiser Rd			
I-10 WB to Ragsdale Rd	RW	RW	49
Ragsdale Rd to Lake Tamarisk Dr	RW	RW	RW
N of Lake Tamarisk Dr	RW	RW	RW
Interstate 10			
Eagle Mountain Rd to Kaiser Rd	194	418	901

RW - Denotes that the CNEL contour does not extend beyond the roadway edge.

The impact of the project traffic on land uses along roadways that will carry project generated traffic is assessed by determining the noise levels along these roadways for (1) existing traffic levels, (2) future projected traffic levels without project, and (3) future projected traffic levels with project. The future (1995 projection) without project distance to CNEL noise contours were shown in Table 8 and the future (1995 projection) with project distance to CNEL noise contours were shown in Table 9.

Two comparisons were made to determine the impact due to project related traffic. The first comparison calculated the noise increase of the future plus project levels over the existing levels, and the second comparison calculated the noise increase of the future plus project levels over the future without project levels. Of the two comparisons, the latter is the more pertinent since it gives the noise increase due strictly to the project. The difference in noise levels will be caused by the increase in traffic due to the project. Table 10 shows the future without project noise levels, the future with project noise levels, and the increase in noise levels of the future with project over the future without project.

In community noise assessment, changes in noise levels greater than 3 dBA are often identified as significant, while changes less than 1 dBA will not be discernible to local residents. In the range of 1 to 3 dBA residents who are very sensitive to noise may perceive a slight change. No scientific evidence is available to support the use of 3 dBA as the significance threshold. In laboratory testing situations humans are able to detect noise level changes of slightly less than 1 dBA. However, in a community noise situation the noise exposure is over a long time period, and changes in noise levels occur over years, rather than the immediate comparison made in a laboratory situation. Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dBA, and 3 dBA appears to be appropriate for most people.

In addition to the noise level increase being significant, two other conditions must exist before the significant increase in noise level will constitute a significant impact. These two conditions are: (1) there must be some sort of noise sensitive land uses (such as residential areas) along the roadway that will be impacted, and (2) the ultimate traffic volume must be great enough to have a significant impact which means that the 65 CNEL noise contour must extend far enough from the roadway centerline to impact any residential areas.

Table 10
INCREASE IN NOISE LEVELS DUE TO PROJECT TRAFFIC

ROADWAY	CNEL NOISE LEVELS AT 100 FEET		
	FUTURE W/O PROJ CNEL	FUTURE W/ PROJ CNEL	INCREASE DUE TO PROJECT (dB)
Eagle Mountain Rd			
I-10 EB to I-10 WB	38.7	48.2	9.5
I-10 WB to Ragsdale Rd	41.0	51.0	10.0
N of Ragsdale Rd	39.0	50.9	11.9
Kaiser Rd			
I-10 WB to Ragsdale Rd	55.4	55.4	0.0
Ragsdale to Lake Tamarisk	48.2	48.7	0.5
N of Lake Tamarisk Dr	46.6	47.3	0.7
Interstate 10			
Eagle Mtn Rd to Kaiser Rd	74.0	74.3	0.3

The results show that there will be some increase in the noise levels due to the project. The roadway with the greatest increase in noise level is Eagle Mountain Road north of Ragsdale Road with an increase of 11.9 dB. The other links along Eagle Mountain Road from Interstate 10 to Ragsdale Road will also have large noise increases of 9.5 to 10 dB. All other roadways will experience increases in noise levels of less than 1 dB.

As stated earlier, in community noise assessment, changes in noise levels greater than 3 dBA are often identified as significant, while changes less than 1 dBA will not be discernible to local residents. Noise level changes in the range of 1 to 3 dBA are considered to be noticeable, but not significant.

Although the noise level increases along Eagle Mountain Road are great, the ultimate future with project traffic volumes are less than 2,000 ADT. With an ADT this low, the 60 CNEL noise contour for this roadway will not extend beyond the roadway edge and therefore, the noise increase impact along Eagle Mountain Road will be insignificant. The other roadways, namely Kaiser Road and Interstate 10, will experience noise level increases of less than 1 dB and will therefore, have an insignificant increase.

A land use map of the project area is currently unavailable, but scattered residential areas were observed along the roadways that will be serving the project as near as 100 feet from the roadway centerline. Also, residential areas were observed approximately 200 feet from the roadway centerline of Interstate 10. Table 11 below shows the noise levels that will be experienced by these worst case residential areas.

Table 11
NOISE LEVELS AT WORST CASE RESIDENTIAL AREAS 100 FEET FROM ROADWAY CENTERLINE

ROADWAY	CNEL @ 100 ft	CNEL @ 200 ft
Eagle Mountain Rd		
I-10 EB to I-10 WB	48.2	-
I-10 WB to Ragsdale Rd	51.0	-
N of Ragsdale Rd	50.9	-
Kaiser Rd		
I-10 WB to Ragsdale Rd	55.4	-
Ragsdale to Lake Tamarisk	48.7	-
N of Lake Tamarisk Dr	47.3	-
Interstate 10		
Eagle Mtn Rd to Kaiser Rd	-	69.8

As can be seen from the above table, the residential areas located along the roadways will not be exposed to significant noise levels in excess of 65 CNEL other than along Interstate 10 where existing noise levels already exceed 65 CNEL. This is a worst case analysis where residential areas were assumed to be 100 feet from the roadway centerline. There may be some undeveloped areas designated as residential that are adjacent to roadways that will carry project related traffic may have homes built on them in the future. If these homes are planned within the roadway 65 CNEL contour line, mitigation measures may be required. More detailed calculations should be preformed when a land use map that identifies the noise sensitive land uses around the Eagle Mountain Landfill site and along the rail and truck haul routes becomes available.

4.3 On-Site Noise

The on-site noise impacts will be attributable to a number of operations that will take place at the Eagle Mountain Landfill site. First, there is the container handling yard which will have the following: 1) railroad spur lines of sidings, 2) equipment for moving containers between the unit trains and the container handling vehicles (shuttle trucks), and 3) equipment for moving containers between the highway transport vehicles and container handling vehicles. Second, there are the internal haul routes, both permanent and temporary, that will be used to transport containers from the container handling yard to the working face of the landfill. Third, the containers will be dumped into the landfill.

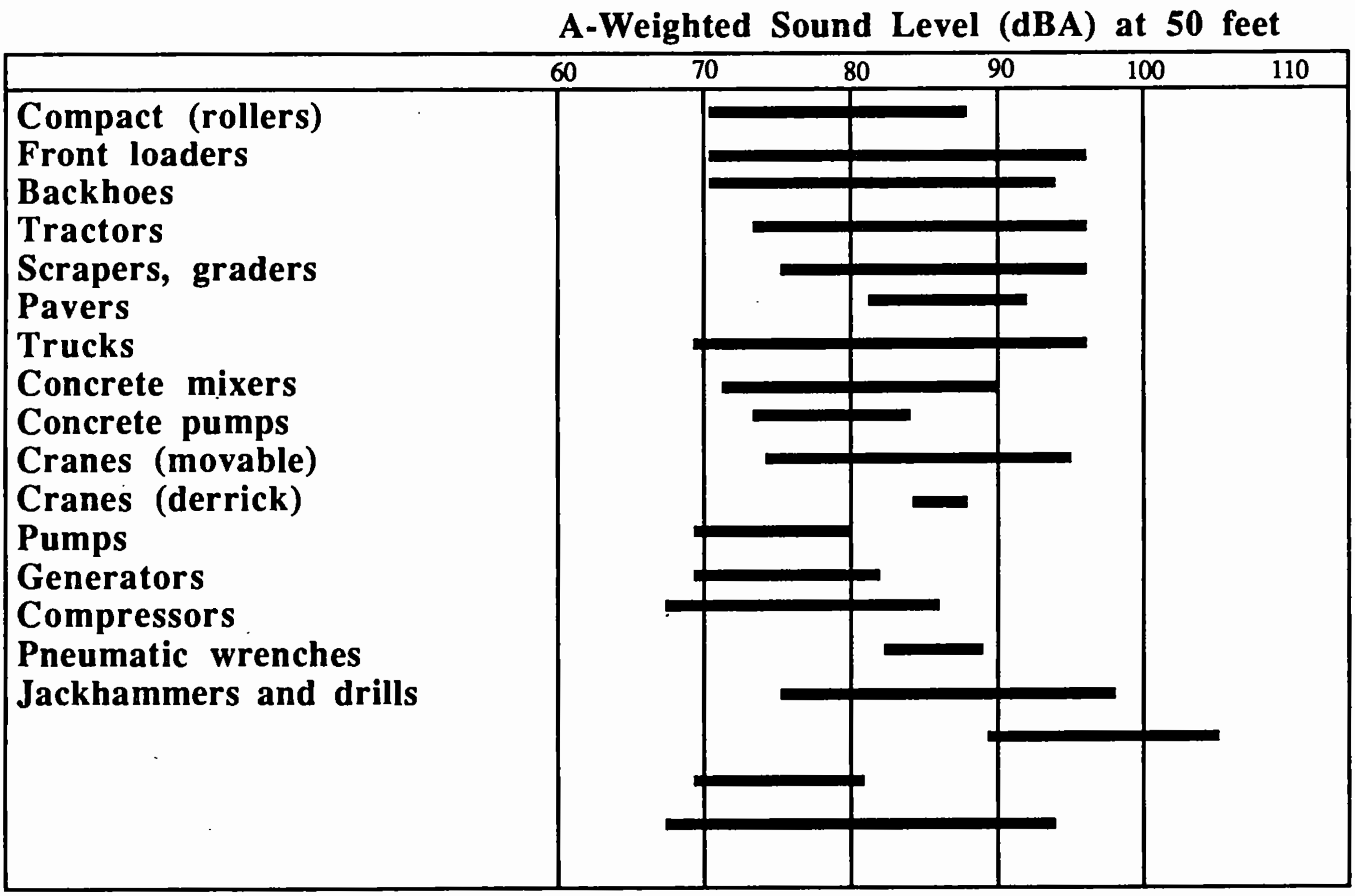
The landfill will have two phases. During Phase 1, the container handling yard will be located toward the middle of the pit on the south side of the pit. Landfill operations will fill the pit westward from the center of the pit. During Phase 2, the container handling yard will be moved to the eastern portion of the pit where the pit will then be filled northeastwardly and southeastwardly.

4.3.1 Container Handling Yard

Noise will be generated by a number of operations at the container handling yard. The primary sources of noise from operations at the yard are:

- *Container Handling Vehicles*
- *Overhead Cranes*
- *Container Handlers*

A list of the equipment that may be used for this project at the landfill site was supplied by SCS Engineering. Noise levels for the earth moving equipment to be used at the landfill site were obtained from Les Burgstrom of the Caterpillar Tractor Company in Peoria, Illinois during a phone conversation on February 27, 1990. The earth moving equipment made by Caterpillar Tractor Company include D-8N crawler tractors, 826 compactors, a 973 trac-loader, 12G graders, and 988 wheel loaders. All the numbers mentioned above are equipment model numbers for the Caterpillar Tractor Company. The noise level of 87 dBA for the 973 trac-loader was also used for the container handling vehicle. Noise levels for the remainder of the equipment that will be used at the landfill site were obtained from the table of construction equipment noise levels compiled by the Environmental Protection Agency (EPA) as shown in Exhibit 7. The equipment noise levels that were used from this table include; front loaders for the container handlers, backhoes, concrete mixers for the pugmill, and cranes (movable) for the overhead cranes. All the equipment noise levels were measured at a distance of 50 feet and are shown below in Table 12. The sound level data shown below represent the peak or maximum sound level that only occasionally occurs.



Source: "Handbook of Noise Control," by Cyril Harris, 1979.

Exhibit 7

Construction Equipment Noise Levels

Table 12
ON-SITE EQUIPMENT NOISE LEVELS
FROM THE CATERPILLAR TRACTOR CO. (dBA)

EQUIPMENT	NO. OF VEHICLES	NOISE LEVEL @ 50 ft (dBA)	COMBINED NOISE LEVEL @ 50 FT (dBA)
LANDFILL OPERATION EQUIPMENT			
D-8N Crawler Tractor	15	84	95.8
826 Compactor	13	80	91.1
973 Trac-loader	7	87	95.5
12 G Graders	3	83	87.8
988 Wheeled Loader	5	82	89.0
Backhoes	1	94	94.0*
TOTAL NOISE LEVEL @ 50 FEET:			*101.0*
DISTANCE TO 75 dBA Lmax NOISE LEVEL (FT):			*993*
CONTAINER HANDLING YARD EQUIPMENT			
Container Handler	2	96	99.0*
Overhead Crane	4	95	101.0*
Container Handling Vehicle	32	87	102.1
TOTAL NOISE LEVEL @ 50 FEET:			*105.6*
DISTANCE TO 75 dBA Lmax NOISE LEVEL (FT):			*1,702*
PUGMILL EQUIPMENT			
Pugmill	1	90	90.0*
TOTAL NOISE LEVEL @ 50 FEET:			*90.0*
DISTANCE TO 75 dBA Lmax NOISE LEVEL (FT):			*281*

* Noise levels obtained from the EPA table.

In Table 12 above, the noise levels of all the equipment expected to operate at the landfill pit area, container handling yard, and pugmill were separated. Then, the equipment noise levels from each facility were summed up, and the distances to the 75 dBA noise level were found. Although Riverside County does not have a noise ordinance, 75 dBA is a typical Lmax noise level not to be exceeded at any time. Exhibit 8 shows the combined 75 dBA noise contour due to operations at the landfill, container handling yard, and pugmill. It should be noted that the 75 dBA contour for landfill pit operations shown in Exhibit 8 assumes that the noise source is from a single point placed at the outer edge of the landfill boundary. Under more typical landfill operating conditions, the noise source will be spread out throughout the landfill pit area. Site observations show that the closest residential land use to the landfill pit is approximately 2,250 feet away. Extrapolating the total on-site operations noise level to this distance of 2,250 feet gives a noise level of 74 dBA. This noise level will be audible at 2,250 feet, but it should be noted that the equipment noise levels obtained from the EPA table are not necessarily noise levels of the exact equipment that will be used for this project. The EPA table merely shows the range of noise levels measured for various pieces of equipment of a certain type, and the maximum noise levels of the loudest pieces of equipment measured were used in the calculation. Also, the earth moving operations at the Eagle Mountain landfill site will mostly take place inside of a landfill pit which will provide shielding for the noise. Finally, having the equipment dispersed throughout the landfill will dissipate the noise generation levels. Taking all of the above factors into consideration, the noise exposure at the residential area 2,250 feet from the landfill pit is expected to be considerably less than the calculation from the worst case scenario. The layout of the operations can be designed to reduce the noise levels on the site even further. A more accurate on-site noise projection should be calculated when more detailed equipment noise data becomes available.

4.4 Construction Noise

Construction noise will occur as a result of the development of the Eagle Mountain Landfill site and its potential noise impacts must be considered. Construction noise represents a short-term impact on ambient noise levels. Every effort must be made to ensure that during construction, excessive noise is not produced. Noise generated by construction equipment and construction activities can reach high levels. Construction equipment noise comes under the control of the Environmental Protection Agency's Noise Control Program (Part 204 of Title 40, Code of Federal Regulations).

The activities that will contribute to the construction noise include grading and establishment of Phase 1, grading and establishment of Phase 2, construction of a truck access road to the Phase 1 site, construction of a truck access road to the Phase 2 site, and loading between the south pile to the southeastern portion of the north pile.

There are existing residential land uses in the Town of Eagle Mountain situated approximately 1/3 mile southeast of the Eagle Mountain Landfill site. Exhibit 7 depicts the range in noise levels for construction equipment referenced to 50 feet. At 100 feet, these noise levels would be 6 dBA less; at 2000 feet 32 dBA less. Therefore, the residential areas in the Town of Eagle Mountain will not be adversely impacted by construction noise.

Residential areas will experience lower ambient noise during the nighttime. Therefore, the sound from the landfill operations are more likely to be audible. The early morning operations such as truck loading may commence as early as 6 a.m. Night-time noise will also include noise from container drop-off and maintenance operations. No landfill operations will take place during night-time hours. The sample model noise ordinance is 5 dB more restrictive during the nighttime hours. Although nighttime noise will more likely be audible, the noise levels associated with container drop-off and maintenance operations will still comply with the sample Model Noise Ordinance.

4.5 Noise Impacts on Threatened Species in the Project Area

The Environmental Protection Agency (Dufour, 1980) reviewed literature on the effects of sound on animals. The research categorized the effects into four general categories. These categories include: hearing impairment, communication masking, non-auditory physiological effects, and behavioral modifications. The effects of these sounds may include: "...loss of habitat and territory; loss of food supply; behavioral changes modifying mating, predation, migration; and changes in interspecific relationships including predator/prey and competition for food and shelter" (Kull et al., 1986).

It is important to point out that research into the effects of sound on animals is a very difficult task. Most research into the effects on animals are based on observations of behavioral responses that are subject to human interpretation, or laboratory electrophysiological response tests. It is difficult to draw a precise parallel between the behavioral response and any specific adverse effect on the animal.

4.5.1 Noise Impacts on the Coachella Valley Fringe-Toed Lizard: Concern has been expressed that sounds generated by the transport of wastes to the proposed Eagle Mountain Landfill site will adversely affect the Coachella Valley Fringe-Toed Lizard (Uma Scoparia). The fringe-toed lizard is listed as a threatened species by the United States Government, and an extensive program has been developed by local agencies in Coachella Valley to protect the lizard's habitat. These agencies have established preserves for the fringe-toed lizard, including the Whitewater Preserve located between Indian Avenue and Gene Autry Trail along the Southern Pacific Rail line that runs through this area and into Ferrum.

Researchers (Bondello et al., 1979) have studied the effects of off-road vehicle sounds on the fringe-toad lizard. This laboratory study investigated the effect of these sounds on the auditory response of the lizard. The study concluded that sound levels greater than 95 dBA (100 dB linear) of cumulative durations greater than 500 seconds results in hearing loss. Loss of hearing could result in reduced prey acquisition and predator avoidance. Without specifically supporting the conclusions of this study, the 95 dBA (100 dB linear) threshold will be used as the basis for the analysis of the acoustic impacts from the increased railroad noise onto the fringe-toad lizard habitat. The main issue to be examined as part of this review is:

- How will noise level increase due to the increase in train operations along the Southern Pacific Rail mainline through the Whitewater Preserve compare to the existing noise levels along the Rail line?

The rail line connecting Ferrum with the Eagle Mountain Landfill site will not pass through the Whitewater Reserve and will therefore, not affect the Coachella Valley Fringe-Toed Lizard. The major frequency range of concern for the fringe-toed lizard is between 900 and 3500 Hz (Bondello 1979, Fey 1988). This frequency range corresponds to the range of maximum acoustic sensitivity to the lizard, and therefore, is most likely the frequency range most important in terms of the detection of prey and predators. The frequency range of the railroad operations at a referenced distance of 100 feet is 80 Hz to 2000 Hz.

In summary, the increase of trains along the Southern Pacific mainline due to the project does not result in any new sources of noise onto the Whitewater reserve. The increase in the number of trains only increases the number of times per day that the preserve is exposed to those noises.

4.5.2 Noise Impacts on the Desert Tortoise

Concern has also been expressed that sounds from the transport of wastes to the Eagle Mountain site will adversely affect the Desert Tortoise. The desert tortoise is listed as a threatened species by the State of California and the United States Government. The main issues to be examined as part of this review are:

- How will noise level increases due to the increases in train operations along the Southern Pacific Rail mainline to and from the Eagle Mountain Landfill site compare to the existing noise levels along the Rail line?
- How will noise due to the use of the Eagle Mountain Rail line between Ferrum and the Eagle Mountain Landfill site compare to the existing noise levels along the currently abandoned Eagle Mountain Rail line?

The existing sound levels along the Eagle Mountain Rail line are insignificant since that line is currently abandoned. There has not been any extensive studies done on the desert tortoises, but one desert tortoise has been observed living at the edge of the railroad track grading area. Also, desert tortoise burrows have been found at the bed of the currently abandoned rail line between Ferrum and the Eagle Mountain Landfill site. It is unknown whether or not the desert tortoise burrows were created prior to the abandonment of the Eagle Mountain Rail Line. The effects of railroad noise on desert tortoises are currently not known, and a more detailed research should be conducted so that the effects of railroad noise on the desert tortoise population can be understood.

5.0 POTENTIAL VIBRATION IMPACTS

Potential impacts due to train pass-bys may include structural vibration in some of the existing residential areas along the rail line. In order to assess the degree of impact due to vibration, it is necessary to first estimate the amount of structural vibration due to the train pass-bys and then to determine the potential health significance of these vibrations.

5.1 Background

Vibration is measured in terms of acceleration. The two most common terms of scaling acceleration are in terms of meters per second squared or in multiples of the acceleration of gravity, commonly referred to as "g's." Exhibit 9 presents a rough indication of the level of vibration that can be expected for several types of activities. The exhibit is divided into three categories; (1) hand-arm, (2) whole body, (3) building.

When an element is excited it will vibrate at its own natural frequency. Similar to a string on a guitar; no matter how fast or how hard you pluck the string it will still vibrate at the same frequency or note. How hard you pluck the string will affect the amplitude or the loudness of the note. You have to change the physical properties of the guitar string, such the length, tension, or weight, to change the natural frequency of the string. Different building elements will have different natural frequencies. Similarly, the different elements that make up the human body have different natural frequencies. The natural frequency varies from person to person and varies depending if you are standing, siting, etc. Typical natural frequencies for both building elements and body elements are presented in Exhibit 10.

Stephens et. al. ("Guide to the Evaluation of Human Exposure to Noise From Large Wind Turbines," NASA Technical Memorandum 83288, March 1982) have compiled data for helicopters, aircraft, and wind turbines which show a correlation between wall, window, and floor vibration for various noise levels. These relationships are reproduced in Exhibit 11. To obtain acceleration levels of 0.001g in floors, walls, and windows, peak noise levels of approximately 95, 80, and 75 dB respectively are required.

Stephens et. al. have also identified the noise levels as a function of frequency that will produce perceptible building vibration. The curves developed for windows, walls, and floors are provided in as Exhibit 12. If noise levels exceed these curves then vibrations that are large enough to be perceived by humans may be evident. The curves are a general guide to the potential generation of perceptible vibrations.

Humans can perceive vibrations through two mechanisms; tactile and whole body. Tactile perception is the sense of touch. Whole body vibrations are experienced when the body as a whole is subjected to vibration, such as a person standing on a vibrating floor. The level at which tactile and whole body vibrations become perceptible differ. The levels of vibration that is perceptible to humans for both tactile and whole body vibrations are also presented in Exhibit 13. Below 1 Hz less vibrations is necessary to perceive whole body vibrations. Since most building elements have natural frequencies greater than 1 Hz, most vibrations will be perceived first through the sense of touch.

	Hand-Arm	Whole Body	Building
10g – 1.0g	Operation of a Jack Hammer	Riding Motorcycle	Building During Demolition
1.0g – 0.1g	Operation of a Chain Saw	Riding in Fork Lift or other Construction Equipment	Home Near Blasting Site
0.1g – 0.01g	Operating Controls for Heavy Equipment	Riding in Automobile or High Speed Train	Home Near Pile Driver
0.01g – 0.001g	Holding Smoking Pipe	Riding in Airplane or Ocean Liner	Home Near Railroad Line
0.001g – 0.0001g	Resting Hand on Cushioned Armrest	Riding in Space Capsule in Orbit	Home in Quiet Rural Area

Exhibit 9

Examples of Vibration Levels

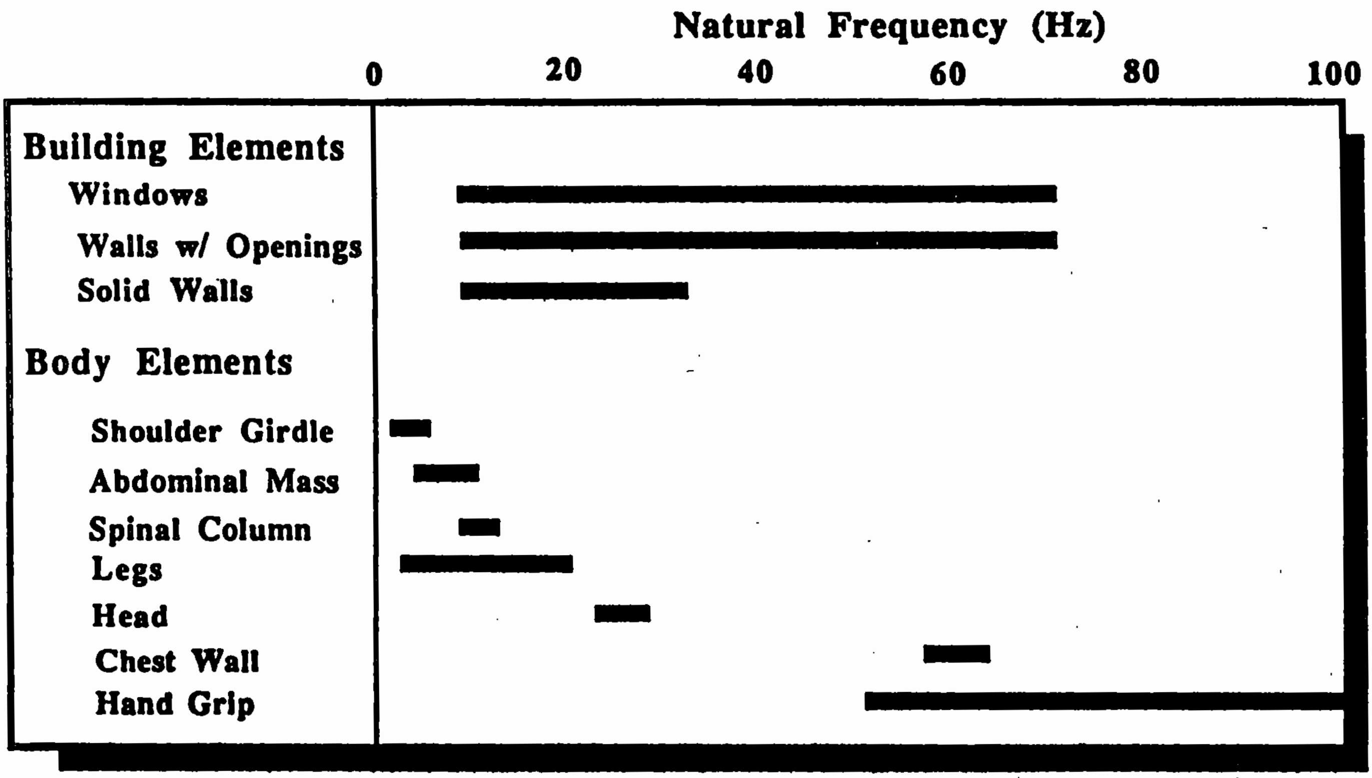


Exhibit 10 - *Examples of Natural Frequencies for Various Elements*

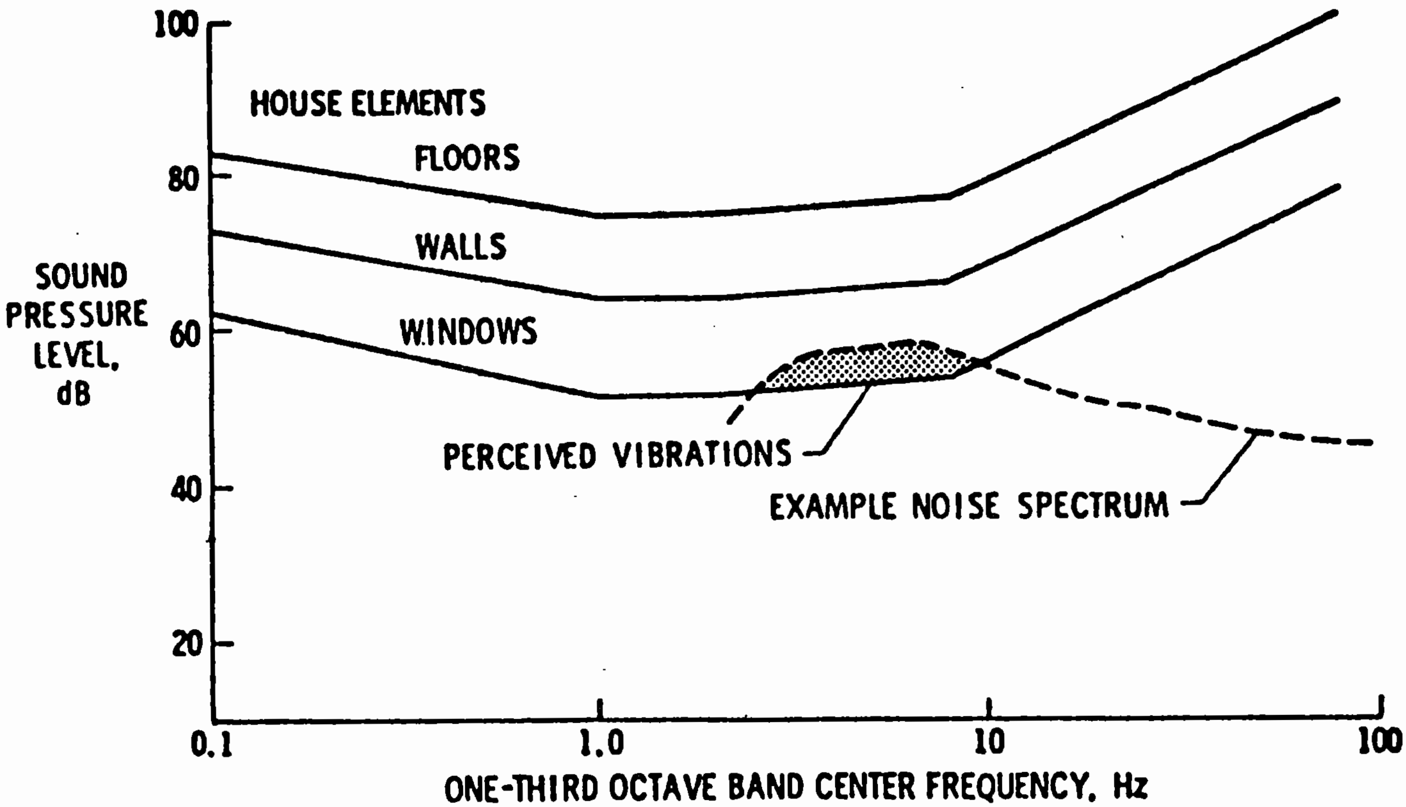


Exhibit 11 *- Sound Levels Sufficient to Cause Perceptible Vibrations*

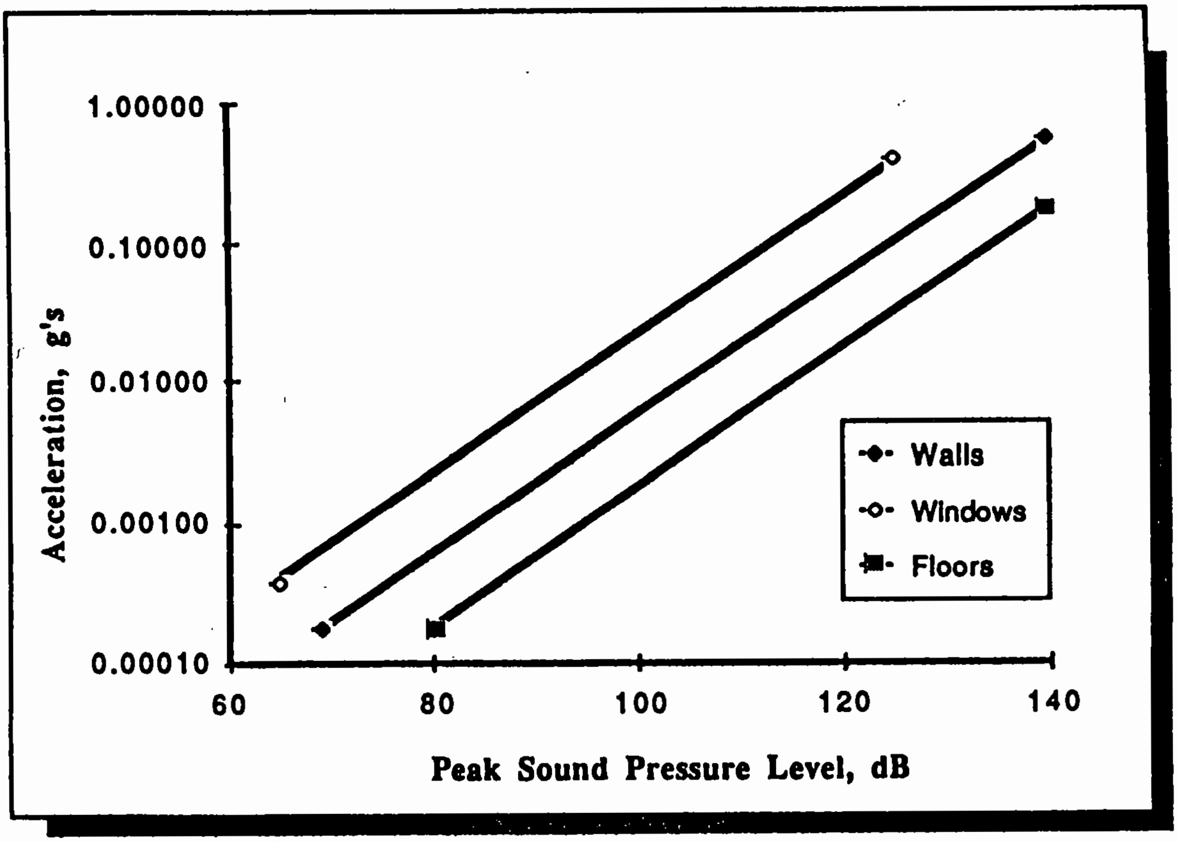


Exhibit 12

Acceleration Generated by Sound Pressure Levels

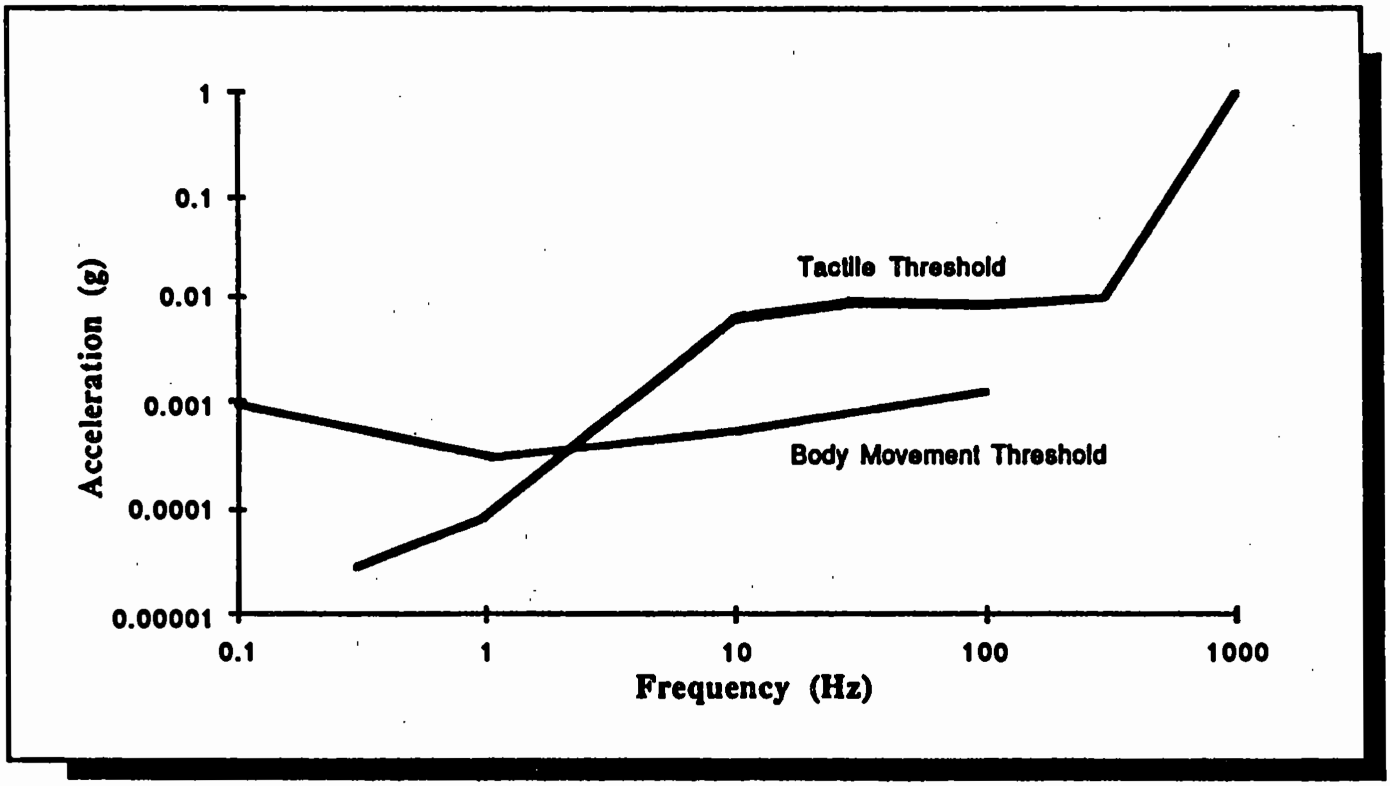


Exhibit 13

Perceptible Levels of Vibration

5.2 Structural Vibration Due To Train Pass-bys

Vibration levels generated by typical train pass-bys were measured on March 1, 1989. For vibration measurements, an accelerometer was set up 180 feet west of the railroad tracks. The equipment used for the vibration survey consisted of an Endevco Model 2272M1 accelerometer, a Bruel & Kjaer Model 2230 precision integrating sound level meter (used only as a signal conditioner), a Sony TCD-D10 digital tape recorder, and a Bruel & Kjaer Model 2123 real-time frequency analyzer. The system was calibrated before and after the measurements with an Endevco Model 4815M1 accelerometer simulator.

5.3 Vibration Exposure

Vibration levels of four train pass-bys were recorded and played back on a Bruel & Kjaer real-time frequency analyzer to obtain the different vibration levels for different frequencies. This showed which frequencies produced the largest vibration levels. Exhibit 14 displays the vibration measurement results. The first column of Exhibit 14 lists the frequency range of the recorded vibration signal in 1/3 octave increments. The next four columns show the measured acceleration in millimeters/sec^2 corresponding to each frequency in the first column. The sixth and seventh columns contain the minimum and maximum acceleration (in meters/sec^2) taken from all four of the trains for each frequency. Columns eight and nine are merely columns six and seven converted into "g's", and column ten and eleven are only columns eight and nine converted into decibels or dB's ("dB re 10^{-6} g" is a standard method of reported acceleration in terms of dB's). The three different units of vibration are presented in Exhibit 14 because of the many different ways that vibration levels are commonly reported in the research literature and in various surveys. In this analysis we will use vibration levels measured in dB relative to 10^{-6} g's . The other units are given for the reader should it be desirable to relate the vibration as measured in different units.

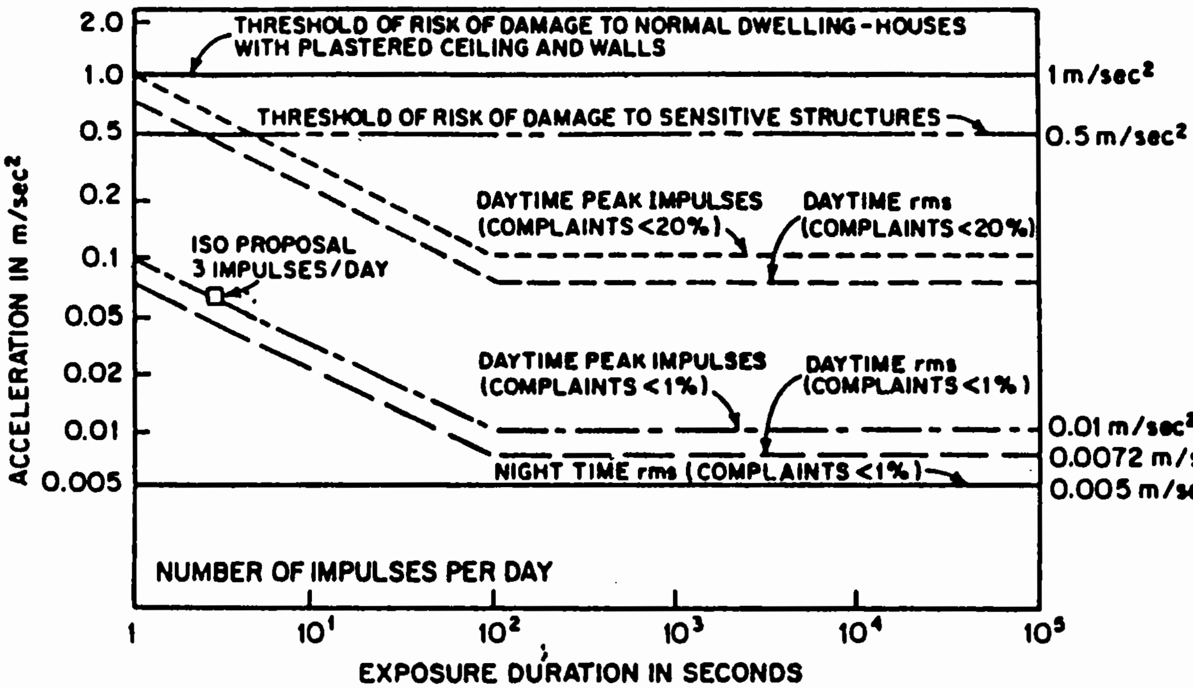
It should be noted that the County of Riverside nor any other municipality that we are aware of has adopted vibration limits for residential land uses. In reviewing literature on the subject, the following reference to vibration recommendations was found. A reference to vibration criteria for residential areas was found in the "Transportation Noise Reference Book", Edited by Paul Nelson, Butterworth & Co. (Publishers) Ltd., 1987. Exhibit 15 presents the criteria for building vibration exposure. Exhibit 16 shows combined response curves for annoyance due to vibration for residential areas. This exhibit shows that the threshold of perception at 8 Hz is about 54 dB where as the measured value on-site is about 66 dB. The graph in Exhibit 15 was referenced from "Transportation Noise Reference Book", page 16/11, fig. 16.13. It should be noted that the vibration levels recommended in residential structures are just barely above the point of perception. While there is no doubt that the vibration levels measured on-site are perceptible during train pass-bys, affects to planned residences are considered to constitute an annoyance or nuisance impact and are not of a magnitude to result in the structural damages or risk to human health. Floor vibration will occur at the site of measurements and in the immediate vicinity. This location, and the vibration levels recorded represent a "worst case" situation.

It is common to find residential areas this close or closer to railroad tracks without significant vibration problems. The vibration levels measured on-site may be due to several factors including the underlying rock or soil types or the condition of the track. Smooth continuous welded track that is well maintained can easily produce 10 dB less vibration compared to rough poorly maintained welded track.

	Measured Acceleration in millimeters/sec^2				Minimum Accel	Maximum Accel	Minimum	Maximum	Minimum dB's	Maximum dB's
1/3 octave					(m/sec^2)	(m/sec^2)	g's	g's	La dB re 10^-6 g	La dB re 10^-6 g
frequency	Train 1	Train 2	Train 3	Train 4	(of all trains)	(of all trains)				
6.3	14.40	6.61	16.50	9.23	.00661	.01650	.000674	.001684	56.6	64.5
8	18.80	6.32	9.31	7.37	.00632	.01880	.000645	.001918	56.2	65.7
10	12.80	7.34	8.03	8.80	.00734	.01280	.000749	.001306	57.5	62.3
12	13.80	6.60	7.17	8.11	.00660	.01380	.000673	.001408	56.6	63.0
16	14.30	8.06	7.30	7.82	.00730	.01430	.000745	.001459	57.4	63.3
20	12.90	7.76	10.10	7.02	.00702	.01290	.000716	.001316	57.1	62.4
25	22.20	8.53	13.50	7.99	.00799	.02220	.000815	.002265	58.2	67.1
31.5	22.70	7.92	11.40	5.07	.00507	.02270	.000517	.002316	54.3	67.3
40	26.90	5.47	8.03	4.78	.00478	.02690	.000488	.002745	53.8	68.8
50	22.70	4.07	4.73	3.17	.00317	.02270	.000323	.002316	50.2	67.3
63	18.40	4.23	4.51	5.35	.00423	.01840	.000432	.001878	52.7	65.5
80	13.90	4.46	3.44	4.86	.00344	.01390	.000351	.001418	50.9	63.0
100	8.84	3.56	4.73	6.03	.00356	.00884	.000363	.000902	51.2	59.1
125	12.80	3.22	3.61	12.90	.00322	.01290	.000329	.001316	50.3	62.4
160	13.60	3.69	2.57	7.36	.00257	.01360	.000262	.001388	48.4	62.8
200	7.30	4.18	3.48	6.79	.00348	.00730	.000355	.000745	51.0	57.4
250	9.30	6.68	4.00	11.60	.00400	.01160	.000408	.001184	52.2	61.5
315	7.40	3.65	3.69	4.54	.00365	.00740	.000372	.000755	51.4	57.6
400	6.01	2.21	1.67	4.02	.00167	.00601	.000170	.000613	44.6	55.8
500	7.90	2.94	2.63	2.98	.00263	.00790	.000268	.000806	48.6	58.1
630	6.80	2.46	2.33	2.74	.00233	.00680	.000238	.000694	47.5	56.8
800	4.70	1.74	1.53	2.06	.00153	.00470	.000156	.000480	43.9	53.6
1000	7.00	2.54	2.53	2.64	.00253	.00700	.000258	.000714	48.2	57.1
1250	5.10	1.96	1.87	2.01	.00187	.00510	.000191	.000520	45.6	54.3
1600	4.20	1.62	1.46	1.55	.00146	.00420	.000149	.000429	43.5	52.6
2000	6.20	2.41	2.34	2.42	.00234	.00620	.000239	.000633	47.6	56.0
2500	4.80	1.96	1.92	1.97	.00192	.00480	.000196	.000490	45.8	53.8

Exhibit 14

Train Vibration Measurement Results



(Source: C. Harris, 1979))

Exhibit 15

Criteria for Building Vibration Exposure

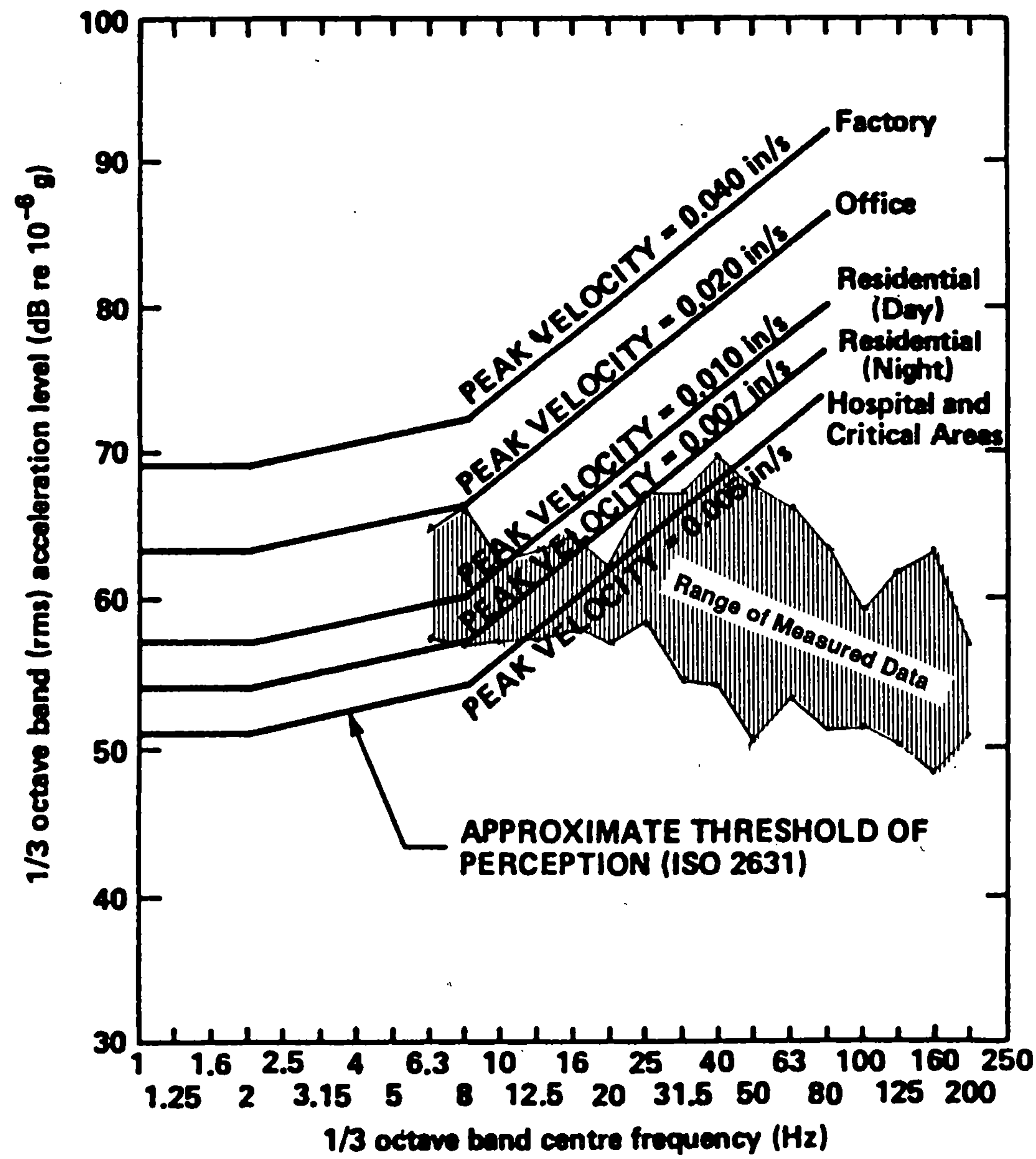


Exhibit 16 - *Combined Response Curves for Annoyance Due to Building Vibration*

6.0 MITIGATION MEASURES

6.1 Noise Mitigation

1) A detailed noise assessment of the loading stations and on-site equipment should be preformed when the final sites and types of equipment have been selected.

2) Devise a program that takes an inventory of the desert tortoise living along the rail lines and monitor them to determine if the increased train operations affect their population.

3) Construction of noise barriers along the portions of the rail lines that adversely impact residential areas once all noise sensitive land uses have been identified and topography is known.

4) A performance condition may be imposed on the unloading/landfill site operations. A performance condition would allow the site operations to proceed as long as specified noise levels (i.e., the Model Noise Ordinance or equivalent) are not exceeded. The noise limits contained in noise ordinances are designed to protect quiet residential areas from excessive noise. The analysis shows that the project would comply with typical noise ordinance levels. A noise ordinance would allow landfill operations to proceed, and provide protection from excessive noise levels. If problems arise, equipment or operations could be modified or noise barriers (temporary or permanent) may be built around the loading and unloading areas in such a way that would result in acceptable noise levels at the adjacent residential areas. The barriers may be walls or berms made of processing material. The local topography will determine the effectiveness of any noise barriers.

APPENDIX

Table A
EXISTING TRAFFIC VOLUMES AND SPEEDS

ROADWAY	ADT	SPEED (mph)
Eagle Mountain Rd		
I-10 EB to I-10 WB	63	35
I-10 WB to Ragsdale Rd	110	35
N of Ragsdale Rd	65	35
Kaiser Rd		
I-10 WB to Ragsdale Rd	3,000	35
Ragsdale Rd to Lake Tamarisk Dr	570	35
N of Lake Tamarisk Dr	400	35
Interstate 10		
Eagle Mountain Rd to Kaiser Rd	12,200	55

Table B
TRAFFIC DISTRIBUTION IN PERCENT OF ADT FOR ARTERIALS

TYPE OF VEHICLE	DAY	EVENING	NIGHT
Automobile	75.51	12.57	9.34
Medium Truck	1.56	0.09	0.19
Heavy Truck	0.64	0.02	0.08

Table C
FUTURE (1995) WITHOUT PROJECT
TRAFFIC VOLUMES AND SPEEDS

ROADWAY	ADT	SPEED (mph)
Eagle Mountain Rd		
I-10 EB to I-10 WB	80	35
I-10 WB to Ragsdale Rd	135	35
N of Ragsdale Rd	85	35
Kaiser Rd		
I-10 WB to Ragsdale Rd	3,690	35
Ragsdale Rd to Lake Tamarisk Dr	705	35
N of Lake Tamarisk Dr	490	35
Interstate 10		
Eagle Mountain Rd to Kaiser Rd	17,080	55

Table D
FUTURE (1995) WITH PROJECT
TRAFFIC VOLUMES AND SPEEDS

ROADWAY	ADT	SPEED (mph)
Eagle Mountain Rd		
I-10 EB to I-10 WB	715	35
I-10 WB to Ragsdale Rd	1,355	35
N of Ragsdale Rd	1,305	35
Kaiser Rd		
I-10 WB to Ragsdale Rd	3,720	35
Ragsdale Rd to Lake Tamarisk Dr	785	35
N of Lake Tamarisk Dr	570	35
Interstate 10		
Eagle Mountain Rd to Kaiser Rd	18,300	55

Table E
TRAFFIC DISTRIBUTION IN PERCENT OF ADT FOR FREEWAYS

TYPE OF VEHICLE	DAY	EVENING	NIGHT
Automobile	40.48	6.23	5.19
Medium Truck	4.16	0.64	0.53
Heavy Truck	33.35	5.13	4.28

APPENDIX I

CULTURAL RESOURCE SURVEY
OF THE
EAGLE MOUNTAIN MINE
AND THE KAISER INDUSTRIAL RAILROAD
CULTURAL RESOURCE PERMIT #CA881916

Prepared for

MINE RECLAMATION CORPORATION
12440 EAST IMPERIAL HIGHWAY, SECOND FLOOR
NORWALK, CA 90650

Prepared by

CHARLES S. BULL
SUPERVISORY ARCHAEOLOGIST

SUE A. WADE
SENIOR ARCHAEOLOGIST

McMILLAN DAVIS
PROJECT ARCHAEOLOGIST

RECON
Regional Environmental Consultants
7460 Mission Valley Road, San Diego, CA 92108 (619) 542-1611

RECON NUMBER 2100A
JUNE 9, 1991

TABLE OF CONTENTS

ATTACHMENTS

FIGURES

I. INTRODUCTION

In response to a proposal by Mine Reclamation Corporation to develop the Eagle Mountain Open Pit Iron Mine into a solid waste disposal site, a team of archaeologists from RECON conducted a cultural resource inventory of approximately 4,659 acres surrounding the mine, including approximately 3,271 acres of Bureau of Land Management (BLM) land slated for Kaiser Steel Resources, Inc. ownerships. The survey also included approximately 1,500 acres of Kaiser-owned lands located along the Chuckwalla Bench which will be exchanged for the BLM land. The 52-mile-long Kaiser railroad running from Eagle Mountains to Ferrum Junction and the existing Eagle Mountain Road and its proposed extension are proposed as access routes to the proposed landfill site. A 200-foot-wide corridor along all these access routes was surveyed (Figures 1 and 2).

Prior to commencing fieldwork, an achival record search was conducted using the resources of the Archaeological Research Unit of the University of California, Riverside. The information gathered from the record search is included with this report as Attachment 1.

Field investigation conducted in 1990 took 98 person-days, conducted simultaneously by two field teams. One team concentrated on the area north of Interstate 10, including the area surrounding the mine, while the other team was assigned to cover the rail corridor and acreage south of the highway. Each team of four archaeologists operated independently until the railroad corridor survey was completed, when the teams were joined to complete the survey of the mine area. In February and March, 1991, eight additional person days were expended completing the field survey of 480 acres of additional BLM exchange lands located on the southern portion of the Specific Plan Area and conducting additional documentation at site Riv-3798.

The survey discovered one previously unrecorded prehistoric site, field designation EMRR-1, as well as nine isolated prehistoric artifacts (Figure 3). EMRR-1 was assigned California trinomial CA-Riv-3798. No previously recorded historic sites were discovered. Department of Parks and Recreation forms (DPR-422a) were completed for each newly located site and isolate and are attached to this report as Attachment 2.

Riv-3216, which was mapped as lying within the area surveyed, was not relocated by the survey team. Riv-3798 consists of a scatter of potsherds and lithics on the southwest-facing slope of a knoll. A major portion of the site has been removed by the excavation of a 10-meter-deep and 20-meter-wide corridor for the railroad tracks.

Since the railroad tracks have cut into the site area, there is no cultural material near the tracks. The nearest relatively undisturbed ground lies about 10 meters to the north of the tracks.

Rehabilitation and use of the railroad and required maintenance activities (which are the only actions proposed for the project in this area) will not involve excavations or movement of dirt. Because the project will have no effect on the resource, no further evaluations are required.

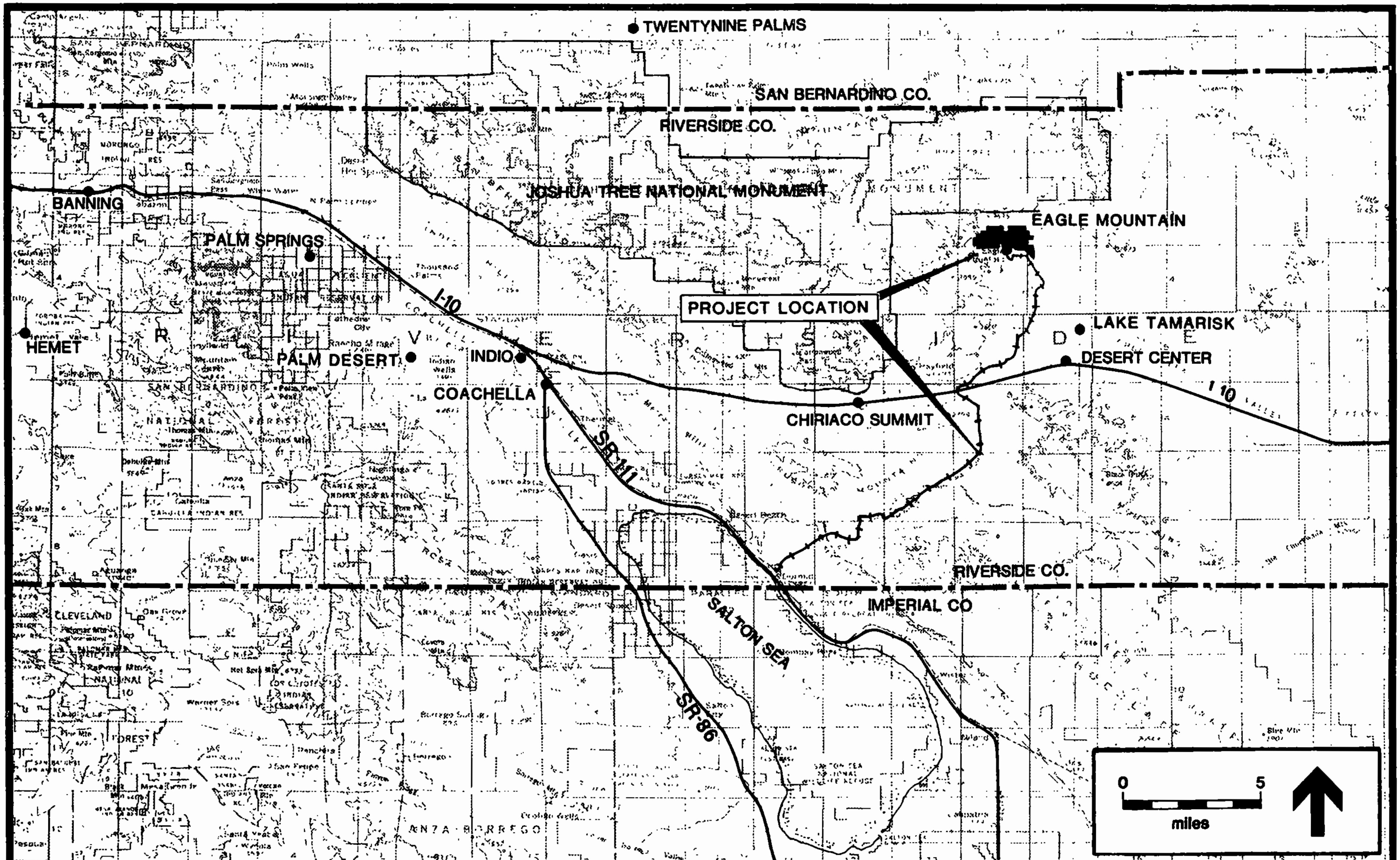


FIGURE 1. PROJECT LOCATION RELATIVE TO EASTERN RIVERSIDE COUNTY

RECON

R-2100F 2/91

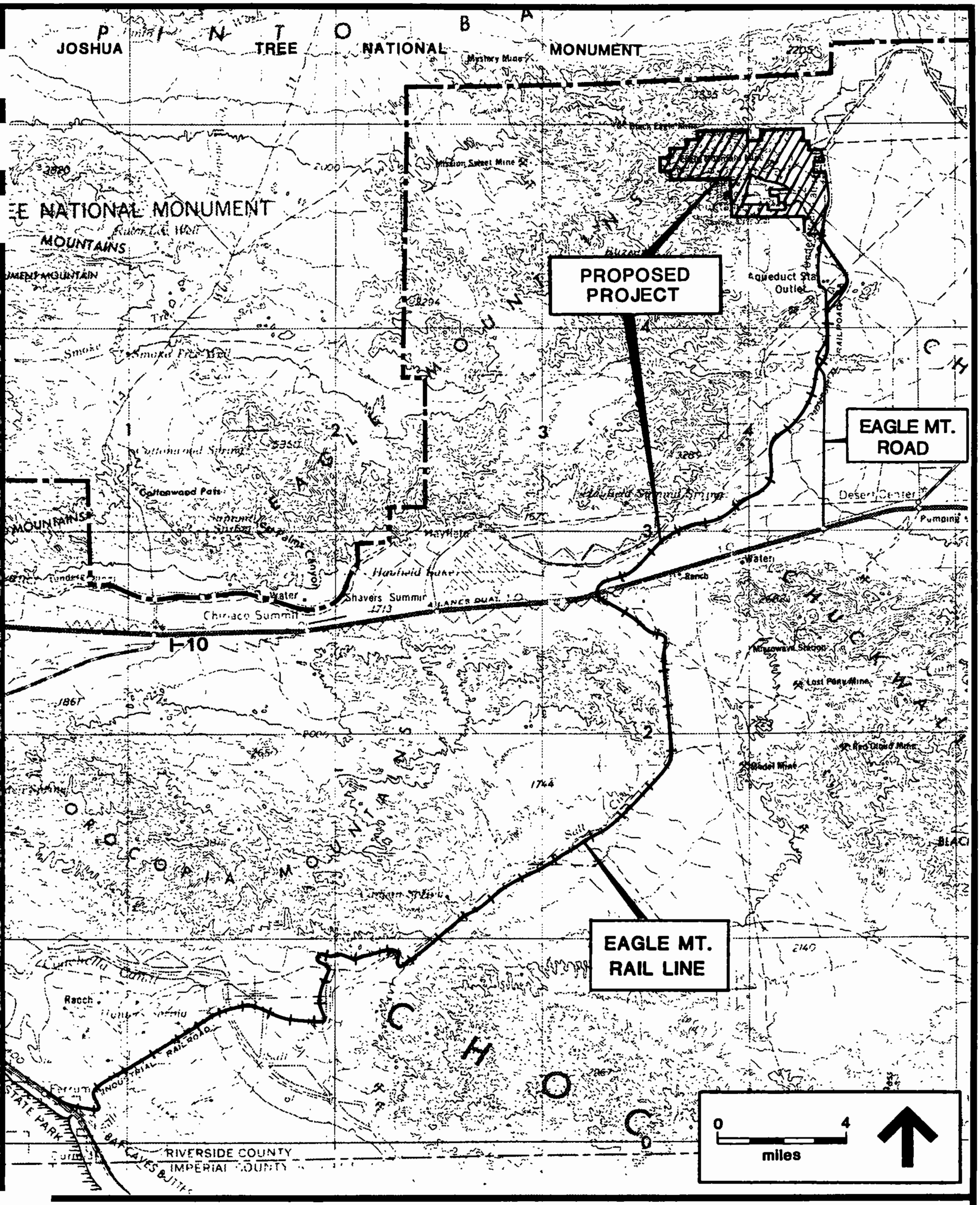


FIGURE 2. PROJECT LOCATION ON U.S.G.S. 1:250,000 SCALE MAP, SALTON SEA SHEET

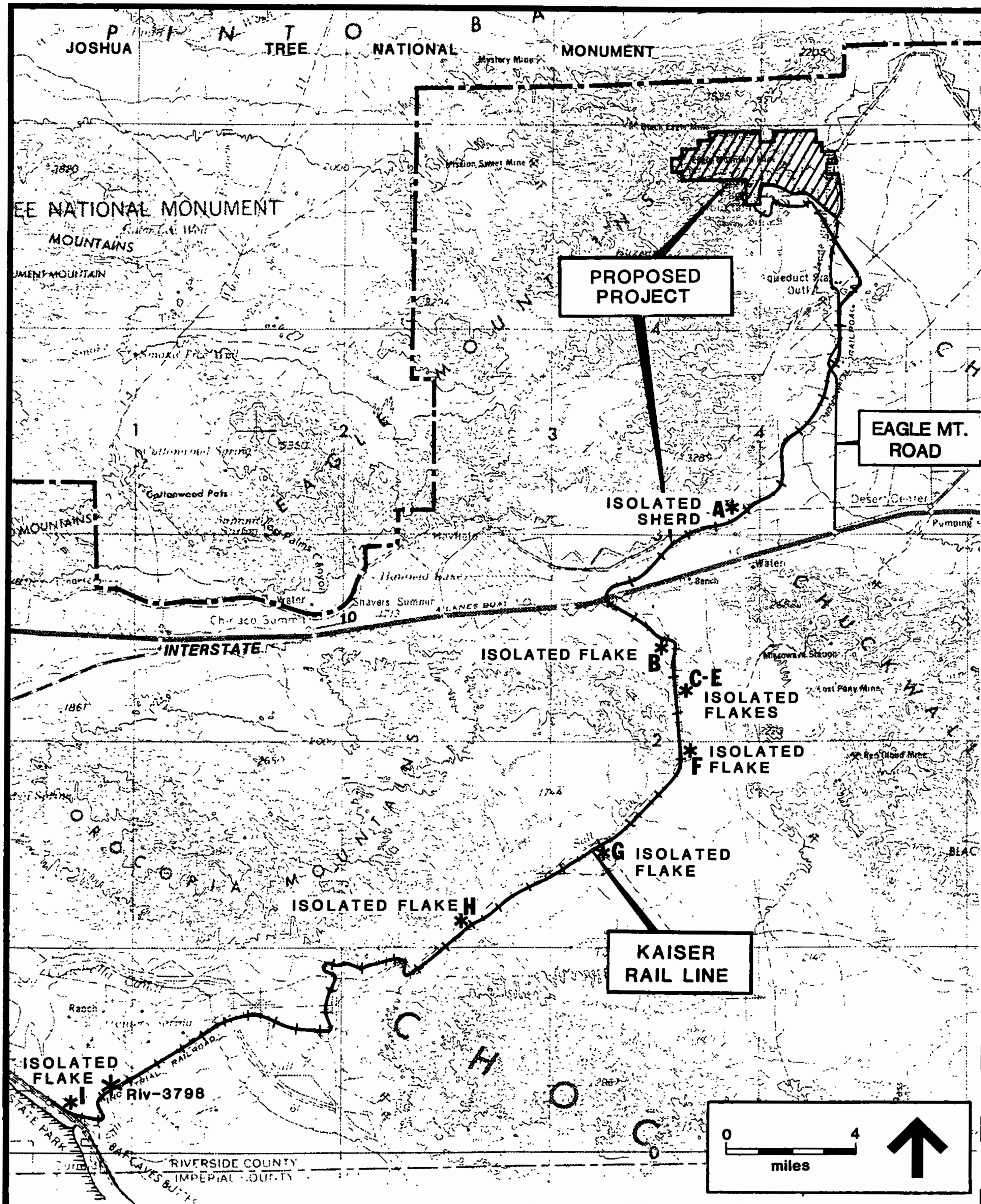


FIGURE 3. LOCATION OF CULTURAL RESOURCES

RECON

II. CULTURAL BACKGROUND

A. REGIONAL OVERVIEW

The area surveyed extends 80 kilometers from the northeastern shore of the Salton Sea to the Eagle Mountains. Within so large an area, a diversity of prehistoric and historic cultural patters are to be expected, lending complexity to even the briefest of synopses. An additional complication is the scarcity of previous investigative data upon which to erect a regional framework.

Most general chronologies of California and desert prehistory begin with the recognition of a possible pre-Projectile Point culture, which would have been present earlier than 15,000 B.P. Advocates of such an early human presence in North America have not succeeded in convincing the scientific majority with their evidence, despite ongoing and vehement dialogue. Without the presence of human remains or unquestioned artifacts in a datable context, it is unlikely that a consensus will be reached (Moratto 1984).

By 15,000 B.P., "there can be little doubt that California was inhabited, albeit sparsely" (Moratto 1984:71). Sites such as Angeles Mesa, the Farmington Complex, and Rancho Murieta have yielded artifacts which have been dated by geomorphologic association at greater than 12,000 B.P. But "the best indicators of widespread occupation in terminal Pleistocene times are the Clovis-like fluted points . . . and related artifacts from numerous sites throughout California" (Moratto 1984:71).

By 14,000 B.P., the cool moist climate of the Late Pleistocene led to the formation of deep pluvial lakes in what are now the Colorado and Mojave deserts. These lakes reached their maximum extent after 11,000 B.P. and then receded during the ensuing 4,000 years until circa 7000 B.P., after which time only playas remained to mark their location (Moratto 1984).

1. The Big Game Hunting Tradition (BGHT)

The period from the end of the Pleistocene to the beginning of the Holocene saw the emergence of a definable culture across the middle of the continent. This Big Game Hunting Tradition is marked by a characteristic tool: the fluted point. These points, often called Clovis or Folsom points (after the type sites), are usually found at large animal kill sites and have been interpreted to represent a life-style dependent on hunting of large herbivores. Although fluted points strongly reminiscent of the Clovis types have been found in California, they have not been found in association with Great Plains type kill sites. This can be taken to indicate that the makers of these distinctive artifacts were not culturally committed to a big game hunting life-style but were able to adapt to more general hunting and foraging subsistence activities (E. Davis 1968, 1974; Davis and Shutler 1969; Hester 1973).

With the discussion restricted to California prehistory, the name "Fluted Point Tradition" (FPT) more accurately designates this culture, which by the weight of the evidence seems to have flourished from somewhat prior to 12,000 B.P. until sometime after 11,000 B.P. (Moratto 1984). Such dates must remain tentative, as the California materials have not been directly dated except by obsidian hydration and there is no independent evidence to confirm the proposed hydration rates. On typologic grounds, "their strong similarity to [radiocarbon] dated specimens farther east implies production in the millennium after 12,000 B.P." (Moratto 1984:87).

During this time frame, evidence is conclusive that many parts of California were inhabited, and sufficient data has been accumulated to allow some assessment of the cultural patterns then present. Three common traits have been identified which characterize the life-style of the FPT:

a. Inland sites are found on the margins of now vanished lakes.

b. Finished lithic artifacts are carefully crafted.

c. The assemblage includes a wide range of specialized and distinctive tool types.

The implication of these traits is that the people who developed the Fluted Point Tradition were, in interior California at least, followers of a generalized hunting and gathering life-style, which was not dependent on large migratory herd animals. These people were adept at exploiting the rich resources in the vicinity of permanent water supplies and were not required to develop the specialized hunting strategies seen in Great Plains sites of this period.

Coincident with the emergence of the Fluted Point Tradition in southeastern California, massive faunal extinctions occurred. The rapid climactic changes which also mark this period undoubtedly were the prime cause of these extinctions, but it is reasonable to assume that the appearance of a substantial population of humans who preyed on the larger herbivores was a significant contributing factor in the rapid demise of many of the previously abundant genera (Kurten and Anderson 1980).

2. The Western Pluvial Lakes Tradition (WPLT)

To describe the culture which apparently appeared subsequent to the Fluted Point Tradition, Bedwell (1970) defined a Western Pluvial Lakes Tradition which extended throughout the Great Basin and into the currently desert regions of southeastern California. By 10,000 B.P., this part of California from China Lake extending well into what is now Mexico held more than ten large bodies of fresh water (Snyder et al. 1964). The southernmost and largest of these pluvial lakes was Lake Cahuilla, which, unlike the others, was intermittently present at varying levels until approximately 500 B.P. (Rogers 1945).

Unlike the earlier periods, where information is fragmented and conclusions are highly tentative, this period in the prehistory of the California desert has been well investigated. Although much of the terminology is unique to the individual investigator, it is possible to lump the Playa, San Dieguito, Lake Mojave, and Death Valley I, as well as non-fluted point shoreline assemblages, into the Western Pluvial Lakes Tradition and clarify rather than obscure the close relationships among the assemblages representing these cultures (Bedwell 1970; Hester 1973). "In all probability, they represented regional variants of an early hunting tradition that prevailed over a wide area" (Wallace 1978:27).

The characteristics which unify the various subcultures under the WPLT are:

a. Sites are generally found on or near former pluvial lakes and marshes or along ancient streambeds.

b. The tool kits and faunal remains indicate that hunting was a primary subsistence activity. The presence of gathered vegetal matter in the diet may be assumed.

c. The assemblages lack ground stone elements.

d. The chip stone tool industry features percussion-flaked foliate points and/or knives, Silver Lake and Lake Mojave points, and a variety of long-stemmed points like those from Lind Coulee (Hester 1973).

e. Additional members of the stone tool kit include crescents, large scrapers fashioned on both flakes and cores, and drills and gravers.

Because most WPLT sites usually occur on exposed surfaces where stratification is absent, the relationship of the WPLT to the Fluted Point Tradition has not been defined with any exactitude. The FPT is apparently the elder of the two, though this is primarily based on cross-stratigraphic associations at other sites. Although WPLT assemblages do not exhibit the characteristic fluted point which defines the FPT, the two are "clearly . . . related both technically and economically" (Moratto 1984:93).

The wetlands adaptation that is embodied in the WPLT persisted as long as the climate was wet enough to keep the lakes in existence, but by circa 7000 B.P., the evaporation of the lakes in the face of a warming and drying climatological trend (Bedwell 1970) presented the aboriginal population with a severe challenge. The archaeological record reflects their cultural response.

3. The Late Cultural Sequence

The initial late cultural sequence for the Colorado Desert was developed by Malcolm Rogers (1929a, 1929b, 1945, 1966). Other investigators amended and expanded Rogers' sequence as new material was discovered. W. J. Wallace (1962) developed a four-stage sequence featuring absolute dates which differed significantly from those proposed by Rogers. Using the data from the Rose Spring site, Lanning (1963) proposed a chronology which was applicable to the northern portion of the California desert. To impose chronological discipline on an increasingly complex situation, Bettinger and Taylor (1974) published a chronology which made no attempt to order the cultural affiliations, but rather presented a series of definitive time markers in the form of projectile points. Warren and Crabtree also published this type of chronology (1972). Warren also published (1980) a slightly modified chronology which was accepted by Moratto (1984) for use in his synthesis of California prehistory. This sequence (from the end of the WPLT) consists of the Pinto period from 7000 B.P. to 4000 B.P., followed by the Gypsum period (4000 B.P. to 1500 B.P.), the Saratoga Springs period (1500 to 800 B.P.), and ending with the Protohistoric period, which includes all prehistoric events following 800 B.P. (Moratto 1984:409-430).

a. The Pinto Period. The Pinto period derives its name from the Pinto Basin site, where most of the early archaeology was done by Elizabeth and William Campbell (Campbell and Campbell 1935). Although very few sites dating from this period have been excavated, the "index fossil," a coarsely made, usually shoulderless point, has been recovered from surface finds over most of the area. No site in the Colorado Desert has yielded materials suitable for radiocarbon dating, but cross-dating by comparison with similar Pinto points from the Mojave desert indicates that the Colorado Desert materials are more recent than 5,000 B.P. (Hester 1973).

An unresolved problem concerning the Pinto period chronology derives from the absence of cultural material representing the earliest parts of the time span. Some investigators, noting the lack of material datable to between 7000 B.P. and 5000 B.P., argue that during this span, the Colorado Desert was probably unpopulated. This cultural hiatus is explainable by the warm, dry conditions which would have made life in the area difficult at best (Wallace 1962). Others, working with the same data, argue that if such a break in occupational history of the region did occur, the gap would be reflected by a discontinuity in the archaeological record. Since they do not detect any such disjuncture, these regions were necessarily occupied without significant interruption (Warren 1980).

Accepted generalizations concerning the life-style represented by the Pinto materials are based on the amount and type of artifacts recovered from the sites. The small assemblages reported for most sites indicate that these sites represent temporary or seasonal camps, and the artifact types argue for a subsistence pattern which depended on hunting as well as exploitation of available vegetal matter, but without a well-defined seed-milling technology. In addition to the characteristic Pinto points, the typical Pinto assemblage contains heavy keeled scrapers, manos, and flat, highly polished slabs whose exact use is the subject of some disagreement (Campbell and Campbell 1935; Rogers 1939). The Campbells describe these artifacts as milling stones, but Rogers disagrees, citing their smoothness as rendering them ineffectual for milling and proposing that they represent a surface upon which hides and/or fibrous plants such as yucca were scraped.

Temporal placement of the Pinto period is somewhat dependent on interpretation of the function of these smooth-surfaced stones, for if they were not adaptable to hard-seed milling, then the ability of the culture to prosper in arid conditions is questionable (Moratto 1984). If, however, conditions at the time represented by the Pinto Basin period were not arid, then the apparent unsuitability of these distinctive artifacts for milling does not pose a problem. Moratto (1984) proposes a series of alternating wet and dry periods, with the population expanding into the desert during the wetter periods and retreating to the margins of the desert and to scattered oases as the climate became more arid. While his remarks are directed at the Pinto period populations in the Mojave Desert to the north, they apply equally to the Colorado Desert.

b. The Gypsum Period. Just as the Pinto period is distinguishable from the earlier WPLT by its characteristic artifacts, the subsequent Gypsum period (4000 B.P. to 1500 B.P.) is similarly distinguished by a change in the types of projectile points recovered. Any combination of Humboldt Concave Base, Gypsum Cave, Elko Eared, or Elko Corner-notched points in the assemblage justify the assignment of the site to the Gypsum period (Moratto 1984). In addition to these diagnostic elements, leaf-shaped points and knives, rectangular knives, drills, large flake scrapers, choppers, and hammerstones are regularly present. For the first time in desert assemblages, manos and milling stones appear regularly.

The cultural affiliations of Gypsum period sites seem dependent on the background of the investigator, with strong reminiscences of both Great Basin (Heizer and Berger 1970; Hester 1973; Bettinger and Taylor 1974) and Southwestern (Rogers 1939) cultures. Both interpretations agree that the Gypsum period material is logically descendent from the earlier Pinto period, with the changes in the tool kit being evolutionary, rather than reflecting any radical shift in cultural patterns. A distinctive Southwest influence is seen in several sites (particularly Newberry Cave) in the form of split-twig figurines, which are "miniature animal figurines, constructed of a single long, thin willow branch, split down the middle, bent and folded so as to create a representation of an animal" (Moratto 1984:417).

Schroedl, in his analysis of these split-twig figurines (Schroedl 1977), determined that this class of artifact was found in two distinct locations. The first type of site where the figurines are found consists of a relatively inaccessible cave, and the figurines are not found in conjunction with any other cultural materials. In this context, the figurines are sometimes pierced by another twig, as if the animal was speared. In the second type of site, the caves are easily accessible, the figurines evidence no special consideration, and the figurines are located in conjunction with normal occupational debris. Where the cultural inventory included projectile points, Gypsum Cave points are most frequent. Schroedl (1977:263) interpreted this dichotomy as indicating a change in the way figurines were regarded. Where the figurines are found cached in remote caves, he infers religious significance; and where the figures are located in conjunction with other artifacts, he infers "toys or playthings."

Newberry Cave also is important for its pictographs, which apparently date from the same (Gypsum period) time as the split-twig figurines and which depict some sort of animal (C. A. Davis 1981). Davis interprets these as representing a bighorn sheep hunting ritual. A similar ritual has been inferred from petroglyphs in the Coso Mountain range (Grant et al. 1968). At Coso, the petroglyphs also illustrate the change from atlatl to bow and arrow, a transition which began within the Gypsum period.

Another Gypsum period site of importance is the late phase of Mesquite Flats, as it marks the appearance of mortars and pestles (Wallace 1977). These tools were employed in exploitation of mesquite pods well into the historic period, and their presence suggests that processing mesquite is also a Gypsum period innovation.

Another innovation, in the form of *Haliotis* and *Olivella* shell beads, also appears during the Gypsum period. These beads occur over a wide area but in relatively small numbers in each site (Moratto 1984) and are proof of contact with coastal California natives.

The Gypsum period represents a period in which the Native American populations of the area became adapted to the dry desert conditions. Technological changes and innovations outlined earlier, as well as the appearance in the archaeological record of proof of trading, mark this period as the beginning of regional diversity, when the life-style of the desert peoples becomes easily distinguishable from that of the adjacent populations.

c. Saratoga Springs Period. Regional differences, which began to become apparent during the preceding Gypsum period, become more pronounced during the subsequent Saratoga Springs period (1500 B.P. to 800 B.P.). In the northwestern Mojave Desert, the change is defined where Rose Spring and Eastgate points replace the previously prevalent Elko and Humboldt points. These smaller points are interpreted to represent increased replacement of the atlatl by the bow and arrow, a change first depicted in the Gypsum period Coso petroglyphs mentioned earlier. Farther east in the Mojave, Anasazi influence is observed. The Anasazi were centered east and north of the California deserts and came to the region ostensibly to exploit deposits of turquoise. This is evidenced by large number of aboriginal mines (Rogers 1929a). Turquoise from the mines at Halloran Springs has been identified at the Snaketown (Arizona) site in levels dated 1500 to 1300 B.P. (Sigleo 1975).

In the Colorado Desert region, the accumulation of evidence points toward cultural influences from the lower Colorado River area, even though evidence which would conclusively decide the issue is lacking. Only the Willow Beach site, which is located in an area of Anasazi as well as Hakataya influence, contains cultural materials older than 1200 B.P., and the data recovered from there does not represent a transition from Gypsum to Saratoga Springs (Moratto 1984).

One apparent difference in the assemblage between Colorado Desert sites of this period when compared with coeval sites in the northwestern and eastern Mojave Desert is the prevalence, in Colorado Desert assemblages, of the triangular Cottonwood series of projectile points as opposed to the Rose Spring points found at the Mojave sites. These sites containing Cottonwood points correspond to Rogers' (1945) nonceramic Yuman culture. Another aceramic site containing Cottonwood series projectile points is Oro Grande, dated to 1100-900 B.P. (Rector et al. 1979). This site is located west and north of the Colorado Desert, but shares Hakataya affinity rather than the Anasazi influence found to the north and east.

As stated earlier, there is insufficient evidence to prove the inferred division of the region into two competing spheres of influence, Anasazi and Hakataya. The Anasazi entered the desert to exploit turquoise deposits, but no such clear goal can be attributed to the Hakataya. The occurrence of coastal shell in Colorado River sites of the period fuels the proposition that these desert incursions were trade expeditions, without long-term settlement.

Toward the end of the Saratoga Springs period, ceramics, in the form of Colorado Brown and Buff wares, appear in the Colorado Desert (May 1976). Also, Desert Side-notched points join the preexisting Cottonwood series points. Both of these artifact types are interpreted as evidence of increased Hakataya influence (Moratto 1984).

d. The Protohistoric Period. The period which follows the Saratoga Springs period is called the Protohistoric: from 1200 A.D. to European contact (Moratto 1984). During this period, the cultural divisions which had been developing for more than 1,000 years have become very visible, and the Colorado Desert was unified under strong Hakataya influence. This unification is visible in the archaeological record in the form of Brown and Buff wares and Desert Side-notched projectile points, which dominate the assemblages. The Hakatayan influence has spread into the southern Mojave Desert, following the withdrawal of the Anasazi after circa 1150 A.D. Further, trade with coastal California native groups is common, given the regular occurrence of shell items in the assemblages. Large well-developed village complexes along the Mojave River and in the Antelope Valley undoubtedly were supported by the increasing coastal-desert commerce (Smith 1963; Sutton 1981), though the Antelope Valley sites reflect more coastal than desert influence, while the opposite is true of the sites along the course of the Mojave. At least one large village complex has been documented in the Colorado Desert (Schaefer 1988). It is probable that occupants of this village traveled seasonally from the coastal mountain foot-hills to the Colorado River to exploit food resources.

The Mojave River trade route apparently was not a self-sustaining economic entity, because both Rogers (1945) and Sutton (1981) report a drop in apparent population levels and abandonment of sites toward the end of the period. Two explanations for this apparent decline in trade are suggested by Moratto (1984). One possibility is that the lakes in the Cronise Basin desiccated. The alternative is that the Chemehuevi tribe migrated from the north to a "blocking position" athwart the trade route.

The first Europeans to enter the Colorado Desert encountered a stable population whose adaptation to the arid surroundings was well developed. Although the accounts of these early travelers are often lacking in sufficient detail to clearly delineate the ethnographic boundaries which were in existence at the end of the Protohistoric period, subsequent reconstructions by several scholars portray the situation at that time with acceptable accuracy.

4. Regional Ethnography

At the time of first contact with the Spanish explorers, who were the first Europeans to enter the Colorado Desert, the region was host to five ethnographically distinct Native American tribal groups. These five groups, whose territories overlapped somewhat, were the Serrano in the northwest, the Chemehuevi to the northeast, the Cahuilla across the southern portion, and the Mohave and Halchidoma along the Colorado River at the eastern extremity (Figure 4).

The following ethnographic sketches are intended to identify these five native peoples within the context of this report. A large body of ethno-graphic literature exists which describes the lifeways of these peoples in detail. Such authors as Kroeber (Mojave), Bean (Cahuilla), and Laird (Chemehuevi) are recommended for in-depth treatment.

a. Serrano. The Serrano take their name from the Spanish word meaning mountain dweller. The area which they exploited is not clearly defined, due both to a lack of information and to a lack of territorially in their political organization (Strong 1929). The Serrano "nation" was composed of

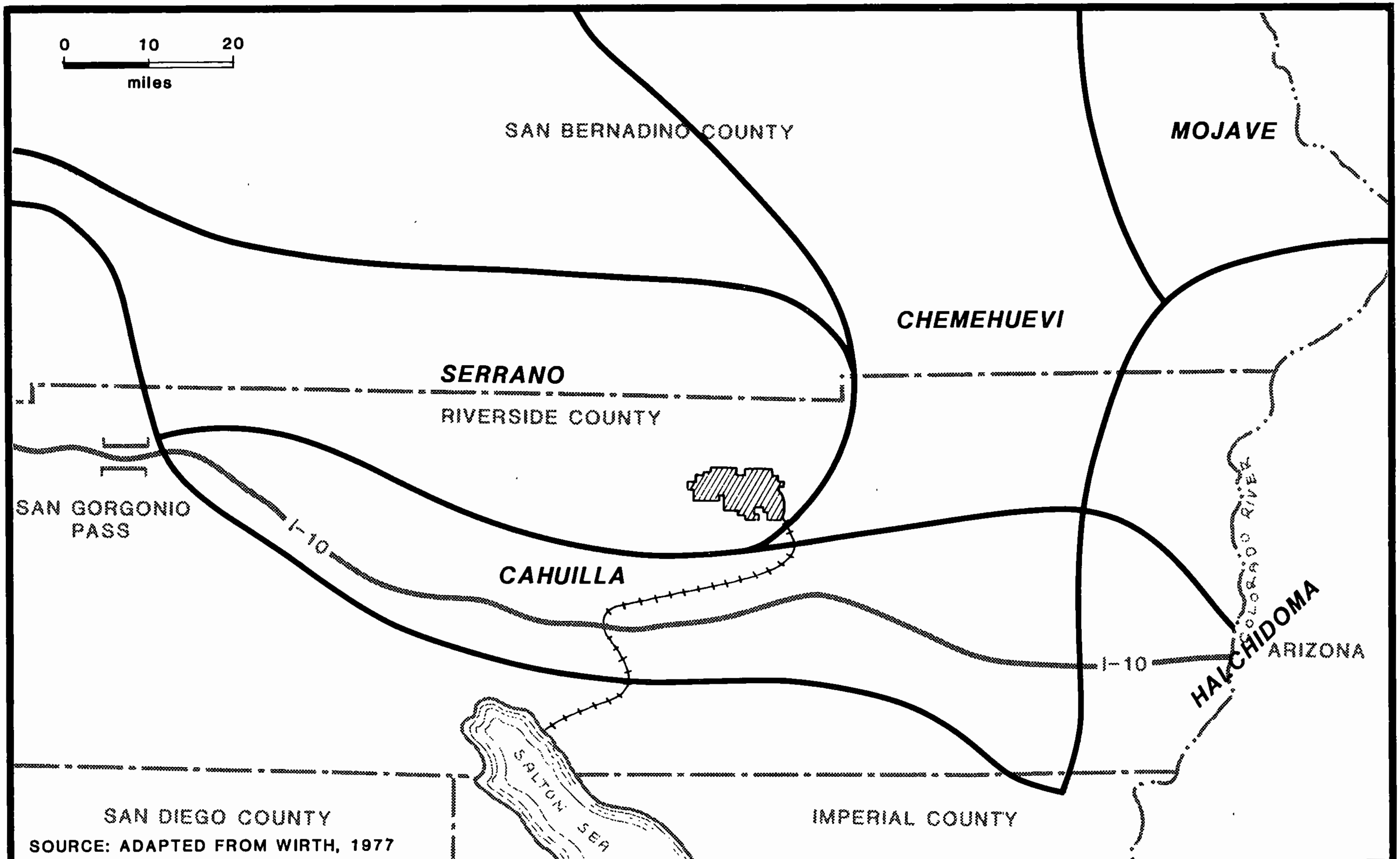


FIGURE 4. ETHNOGRAPHIC BOUNDARIES AT TIME OF EUROPEAN CONTACT

RECON

independent local lineages, each of which occupied a preferred area, and territorial claims did not extend much beyond this local base. Linguistically, the Serrano dialects may be typed as belonging to the Serran group, Takic subfamily, of the Uto-Aztecan family (Moratto 1984:534).

Overall, the dialectically similar lineages which together made up the Serrano were located from the Cajon Pass on the west to just east of the present-day city of Twenty-Nine Palms and from the desert around Victorville south to today's Interstate 10. This is an area with a great deal of ecological diversity, a fact which forced considerable variability into the Serrano subsistence pattern (Bean and Smith 1978).

The location of Serrano settlements within this overall area were usually determined by the availability of water. Most settlements were in the foothills of the local mountain ranges, although some were situated in the desert near permanent water (Benedict 1924). From these locations, the Serrano carried out a round of hunting and gathering, supplemented to some degree by trade with neighboring lineages (Kroeber 1925).

Individual extended families occupied a rounded, domed dwelling, usually consisting of a willow framework thatched with tule reeds. This was frequently augmented by a wall-less ramada whose shade provided a more pleasant environment for household activity (Drucker 1937). Aside from the individual dwellings, each settlement usually had a ceremonial house, granaries, and a sweathouse. This last structure was located, where possible, next to a pool or stream (Strong 1929).

The Serrano industry utilized shell, wood, bone, stone, and plant fiber to fashion baskets, pottery, stone tools, storage pouches, and a variety of less utilitarian items including musical instruments of several kinds (Bean 1962-1972).

b. Chemehuevi. Of all the ethnographic groups whose territories abutted the survey area, the Chemehuevi are the least documented (King 1975). Originally the Chemehuevi, whose language may be classed as belonging to the Southern group of the Numic subfamily of the Uto-Aztecan family (Moratto 1984:534), resided in the High Desert, and ethnographers have indicated a close relationship with the Southern Paiute (Euler 1966; Heizer 1966). A short time prior to European contact, the Chemehuevi apparently moved into the project area between the Colorado River and the Coachella Valley (Kroeber 1925). After initial contact with the Spanish, the Chemehuevi formed an alliance with the Mojave and evicted the Halchidoma from the Lower Colorado River (Kroeber 1925). Circa 1867, a war erupted between the Mojave and the Chemehuevi, with the result that the Chemehuevi were forced from the lands bordering the Colorado River into the desert. After this defeat, the Chemehuevi tribe became fragmented, some members of the tribe settling around the present site of Twenty-nine Palms, a few taking up residence at Cabazon, and the majority returning piecemeal to the Colorado River area during the following decades (Wirth 1977).

Chemehuevi settlements consisted of groups of related nuclear families, and the size of the village waxed and waned with the seasonal round. The winter season saw the community reach its maximum size, while in the spring, families dispersed over the desert to take advantage of emergent plant growth.

These villages functioned as semipermanent home bases and featured shades, earth houses, and brush dwellings (Laird 1976).

The Chemehuevi subsistence strategy relied upon a seasonal round of hunting and gathering, augmented by agriculture. It has not been established how long the Chemehuevi have practiced agriculture. Laird (1976) indicates that there are no tribal memories of a preagricultural time. Trade probably played a small part of the Chemehuevi economic system (Davis 1961).

No uniquely Chemehuevi industry has been reported. In common with all of the native peoples of the Colorado Desert, at the time of contact they were constructing tools from stone, wood, and bone and producing baskets and pottery. Since the Chemehuevi are relative latecomers to the study area, the development of their culture is not documented in the archaeological record, and much of the technology which they were employing when first contacted seems to have diffused from the Mojave.

c. Mojave. The Mojave occupied the lands along the Colorado River, centered on the Mojave Valley, east of the Colorado River at the latitude of the present-day city of Needles. According to Schroeder (1952), these Yuman-speaking people arrived in the Mojave Valley from the desert to the west around 1150 A.D.

Once in place along the Colorado River, the Mojave developed an economy based on floodplain farming, augmented by gathering, fishing, and occasional hunting. Fishing provided the principal flesh food (Stewart 1983).

Settlement patterns among the Mojave did not include villages, but rather a rural pattern of dwellings in close proximity to arable land prevailed. The houses were occupied only during cold winter weather and were constructed of poles, thatched, and covered with sand and mud (Stewart 1983).

The Mojave culture is distinctly different from that of the majority of the Colorado Desert peoples in one important aspect. While most native peoples felt affinity primarily to their lineage, and secondarily to the area which they inhabited, the Mojave thought of themselves as one nation and relegated both kinship and village membership to secondary status (Kroeber 1976:727). Given this sense of identity, the propensity of the ethnohistoric Mojave for organized warfare becomes more understandable. K. M. Stewart (1947) describes the Mojave preoccupation with warfare as the result of actions by a warrior cult within the tribe and further states that according to his informant, "the people as a whole were pacifically inclined" (Stewart 1947:257).

Mojave technology was strictly utilitarian, with tools fashioned strictly to accomplish the task at hand. Kroeber (1925) attributes this indifference to craftsmanship to the Mojave practice of destroying all of the property of an individual as part of the funeral ceremony.

d. Halchidoma. These Yuman-speaking people occupied the lands along the Colorado River immediately south of Mojave territory and immediately north of that held by the Quechan (Yuma). Their history in the region terminates in 1827-29, when they were defeated by the Mojave and driven eastward from the Colorado River, where they were integrated with the Maricopa. Today, any

Maricopa who makes a claim for a Colorado River ancestry is called Halchidoma (Harwell and Kelley 1983).

Almost no data describes the life-style of the Halchidoma during their tenure in the study area. In all probability, their economy and industry were very similar to both of their river neighbors, consisting of floodplain farming, augmented by fishing and gathering. Also consistent with the pattern, their dwellings would be separated along the river to take advantage of good cropland, rather than concentrated into villages.

e. Cahuilla. The prehistoric territory of the Cahuilla covers the project area's western and southern flanks and extends from the San Bernardino Mountains on the west to the Oricopia Mountains on the east. Great geographic diversity exists within these boundaries, and the Cahuilla adapted to use the resulting diverse environment to advantage. The Cocopa-Maricopa Trail, a major prehistoric and historic trade route, crossed Cahuilla territory.

The language spoken by the Cahuilla belongs to the Cupan group of the Takic subfamily of the Uto-Aztecan family. Other Takic-speaking tribes which interacted with the Cahuilla were the Gabrielino and the Serrano, with whom many common traditions were shared (Bean 1978) and with whom intermarriage and trade were common.

Cahuilla villages were situated to take advantage of the protection from the desert winds provided by alluvial fans and canyons and to allow easy access to water and food sources. From these permanent bases a seasonal round of hunting and collecting could be conducted, and the number of occupants varied with the season. Houses were constructed of desert brush and were variably sized, with the chief's house being noticeably larger and used for ceremonial and recreational purposes. A sweathouse and granaries were also common features of the village (Bean 1972).

The economic system depended heavily on hunting, but the varied ecological zones occupied by the Cahuilla allowed them to develop a utilized flora of several thousand species (Bean and Saubel 1972). Preservation methods for both meat and vegetal material were well developed, and where water was adequate, agriculture was practiced.

Cahuilla industry was similarly varied, with stone, wood, and bone tools, pottery, and basketry all commonly utilized. No forms unique to the Cahuilla, and therefore capable of serving as archaeological markers, are reported (Kroeber 1908).

5. Regional History

Although the Spanish exploration of the American Southwest began prior to 1540, the region surrounding the project area was not penetrated until much later. Fernando de Alarcon may have reached the site of the present-day town of Yuma, Arizona, in 1540 (Bancroft 1886) while exploring the mouth of the Colorado River, but it was not until two centuries later that the Colorado Desert was penetrated by Europeans. In the interim, a party under Juan de Onaté traveled down the Colorado River in 1604, and after 1699, Father Eustablio Kino would be established in residence at the junction of the Colorado and Gila rivers. The area east of the Colorado was regularly traveled during this century, being served by overland routes into what is now Mexico.

The initial European venture into the Colorado Desert was the journey of Father Francisco Garces, who in 1771 made his way from Sonora in Mexico to the San Jacinto Mountains, just west of the present site of the city of Palm Springs. During his journey, he lived among the Yuman-speaking tribes and won their trust, so that he was able to wander freely and receive help in the form of food, shelter, and guides. Upon his return to Sonora, his accounts of his travels were received with enthusiasm, and in 1775, an expedition under Captain Juan Bautista de Anza, guided by Garces, left the presidio of Tubac (Arizona) for the California coast. This party, which originally numbered in all 235 people (Bancroft 1886), reached the mission at San Gabriel on January 4, 1776.

De Anza's route, across the desert and over the San Gorgonio Pass, was made possible by the aid of the native peoples living along the route, from whom he was able to receive needed supplies and advice (Forbes 1964). The success of this expedition led to the establishment of two small settlements on the Colorado, but these were short-lived, being destroyed by the Yuma, who rebelled against Spanish domination in 1781. Father Garces was killed in this uprising, and the overland route to the coastal missions effectively closed (Warren and Roske 1981).

The next chapter in the history of the study area follows a 40-year hiatus. After control of Alta California passed from the Spanish to the Mexican authorities in 1820, interest was rekindled when a group of natives from the Cocomaricopa tribe arrived at San Gabriel and revealed to the Europeans a new route, to be known as the Cocomaricopa Trail. This route, which bisects the project area, originated east of Blythe and generally followed the route of Interstate 10, also crossing the San Gorgonio Pass. The Mexican government dispatched Jose Romero and Jose Estudillo to scout this new trail. Their first attempt, in 1823, failed; but in 1824 they succeeded in reaching the Colorado River at Blythe (Bean and Mason 1964). Mexican authorities concluded that this route was inferior to the more southern Yuma route.

The next trail to cross the Colorado Desert began near the town of Ehrenburg (Arizona) and continued to Los Angeles. Called the Bradshaw Trail after William P. Bradshaw, who opened the route in 1862, it crosses the survey area between Tabeseca Tank and Canyon Spring (Warren and Roske 1981). Frink's route, surveyed in 1855-57 but not opened until 1863, crosses the survey area in three places as it loops north of Desert Center, then south to generally parallel Bradshaw's route.

Between June 1875 and May 1876, U.S. Army Lieutenant Eric Berglund conducted two expeditions to determine the practicality of a proposal to use Colorado River water to irrigate the desert. His routes, from Ehrenburg to Los Angeles in 1875 and from Los Angeles to Ehrenburg in 1876, also crossed the study area (Warren and Roske 1981).

All of the early European incursions into the Colorado Desert shared one common goal: to facilitate transportation from the previously developed areas east of the Colorado to the emerging settlements on the California coast. Whether Spanish, Mexican, or American, these trailblazers regarded the Colorado

Desert as an obstacle rather than an opportunity. Figure 5 depicts the routes which transited the survey area.

With the exception of some very early Spanish efforts near the Colorado River, at the Cargo Muchacho Mountains in 1780-81 (Warren et al. 1981), exploitation of the mineral resources hidden in the mountains surrounding the Colorado Desert did not become an important reason for Europeans to visit this area until well after the country passed into American control in 1848. By 1875, the mountains surrounding the study area were dotted with recognized prospects (Shumway et al. 1980). The earliest of these claims were for gold and silver, but as the United States continued to expand, its burgeoning industries spurred the demand for a host of other minerals, including iron, manganese, copper, fluorite, gypsum, and salt (Warren et al. 1981).

Agricultural exploitation of the desert proper was, and continues to be, thwarted by the lack of water. Adjacent valleys, such as the Coachella, where the water table permitted wells to be dug, developed active farming and ranching communities, and cattle grazed on most of what is today the Imperial Valley. These enterprises were severely limited by the lack of freely available water, as was the case throughout most of California south of the 35th parallel. To cure this deficiency, proposals to tap the flow of the Colorado River had been made as early as 1859, when Dr. Oliver M. Wozencraft contemplated reclamation of the desert by diverting Colorado River water and went so far as to obtain rights from the California legislature (de Stanley 1966). This project was overcome by the Civil War. The U.S. Army, in 1875-76, sent Lt. Eric Berglund to survey possible routes for a canal, but no action resulted from his expedition.

The apparent surplus of water in the Colorado River was widely viewed as the answer to the chronic shortage in southern California, and efforts to match the supply and the demand continued. The initial efforts to divert the river to water the desert occurred in the area just south of the study area, when in 1886, the California Development Company was organized and excavated a canal along the United States-Mexico border. In some places, this canal was constructed on Mexican soil. By 1905, this canal was providing enough water that agriculture could replace cattle grazing in the Imperial Valley, and towns such as El Centro, Calexico, Heber, Brawley, and others were incorporated (Norris and Carrico 1978). But beginning in 1905, a series of natural events abetted by human mismanagement led to the temporary rerouting of the Colorado into the Salton Sink, creating a freshwater lake (Salton Sea) extending over 400 square miles by 1915, when the river was finally rechanneled (Lee 1963).

The demand for fresh water in the Los Angeles area spurred the next canal project, the Los Angeles Aqueduct. Construction of this part-canal, part-pipeline water system was accomplished between 1934 and 1941. Passing directly through the Eagle Mountains, this project had more effect on the study area than any other human endeavor except the mine itself. Beginning at the Parker Dam, water in the aqueduct is propelled by pumping plants which were constructed in the desert at Iron Mountain, Victory Pass, and Hayfield. To power the pumping plants, long-range electrical transmission lines were constructed and camps constructed to house the workers. The remains of electrical substations and camp and service facilities, including a hospital, remain evident adjacent to the project boundary.

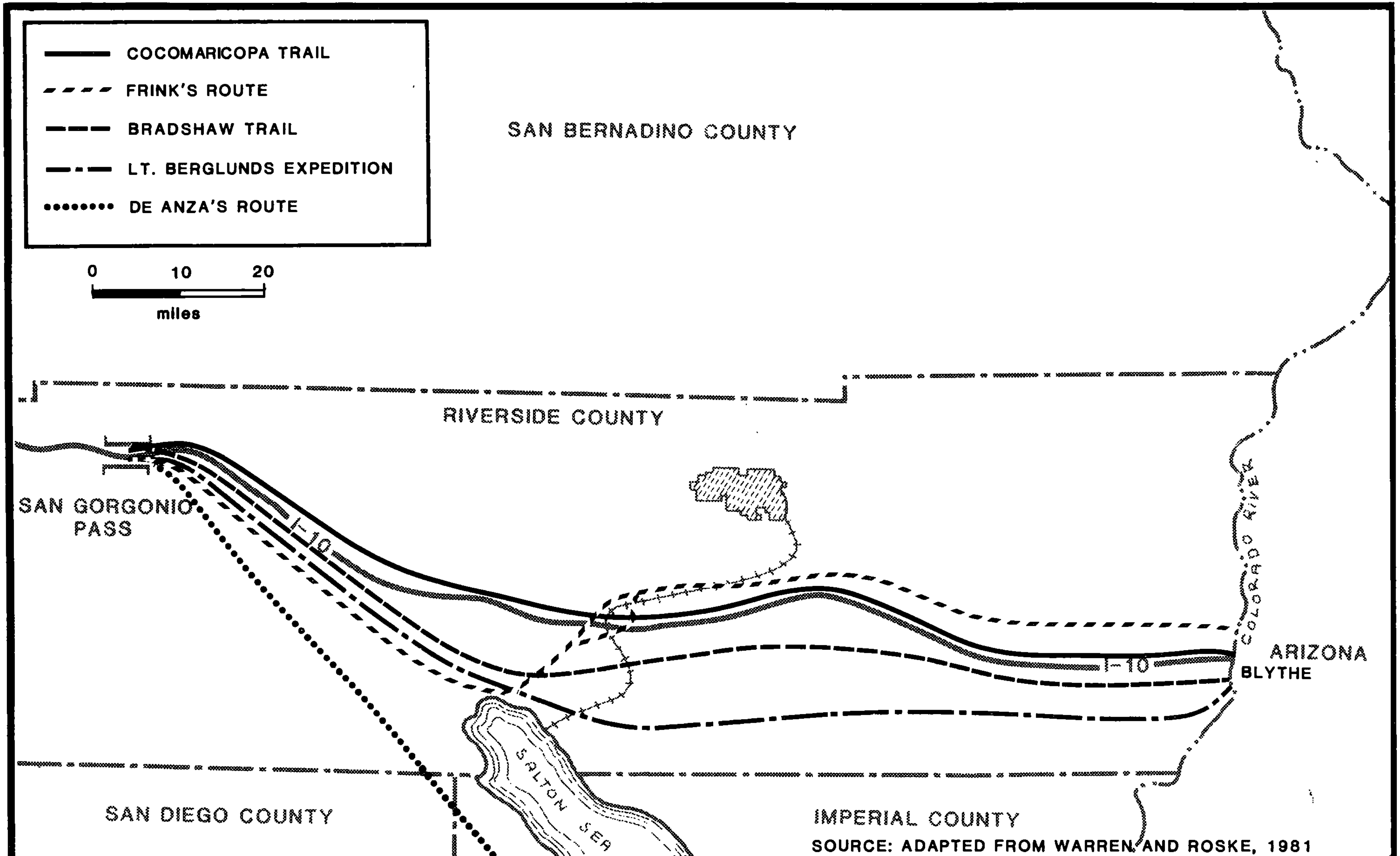


FIGURE 5. DESERT TRANSPORTATION AND COMMUNICATION ROUTES

RECON

During World War II, the study area was the home of the Desert Training Center, established by General George Patton in 1942. The center, which originally consisted of over 10,000 square miles, grew with the expanding war effort, until by 1944 it consisted of nearly three times its original size and spilled over into Arizona. By then, the name had been changed to California-Arizona Maneuver Area (CAMA), and over a million troops had participated in the full-scale training maneuvers. This period of history is memorialized at the General Patton Museum at Chiracio Summit, close to the site of Camp Young, one of the many military installations associated with the CAMA (Chiriaco, personal communication, 1989).

Another military activity which marginally affects the study area is the Chocolate Mountains Aerial Gunnery Range, currently used for both air-to-air and air-to-ground weapons training administered through the U.S. Marine Corps Air Station at Yuma. The Kaiser Industrial Railroad passes through the extreme northwest corner of the range, well distant from any of the targets.

This general historical sketch of the region has been necessarily brief, serving to place in perspective the considerations that compelled Europeans to first visit and then develop the Colorado Desert. In chronological order, the historic exploitation of the study area developed from four desires: the desire for an overland route to the Pacific Coast, the desire for mineral wealth, the desire to divert Colorado River water, and the desire to create realistic combat maneuver areas. Since the end of World War II, an additional desire, for space suitable for vehicular recreation, has driven additional development in the study area.

B. PREVIOUS RESEARCH

1. Prehistoric Research Projects in the Survey Area

Prior to the commencement of fieldwork, an archival record search was conducted at the Archaeological Research Unit of the University of California (UC), Riverside. Additional searches were also conducted using RECON's proprietary library and the records held at the Kaiser Eagle Mountain Iron Mine administration building. A copy of the UC Riverside record search is attached to this report.

The results of these searches revealed that only one previously recorded prehistoric site, Riv-3216, was located inside the boundaries of the survey area. This site was originally recorded in May, 1987, and revisited in November, 1987, at which time it was described as a "lithic scatter with several flakes and tools in two loci. Artifacts appear to be washing downhill. Other quartz tool noted previously but not relocated" (see Attachment 1). This site was recorded during a transmission line survey project (Imperial Irrigation District 230-kilovolt transmission line). The survey for that project also located three additional sites within one mile of the current project boundaries, Riv-477, Riv-3217, and Riv-3373.

An additional area of prehistoric cultural activity is the Canyon Spring area, where the railroad passes between the Oricopa Mountains and the Chocolate Mountains. This site, Riv-362, lies approximately one-half mile outside the survey boundaries and consisted of two potsherds when recorded in 1965.

One additional survey within the boundaries of the current project was conducted by the Archaeological Research Unit of UC Riverside on 160 acres immediately east of the East Pit at the Eagle Mountain Iron Mine. This survey found no evidence of cultural activity (Swenson 1978).

2. Summary of Historic Research

From the archival record search, only one area of historic cultural activity has been located within one mile of the boundaries of the project. This site, Riv-1571, is located about 500 meters northwest of the Kaiser industrial railroad just below Canyon Spring. Consisting of two rock walls, a possible tent pad, and a scatter of historic trash which contained no time-diagnostic artifacts, this site had been repeatedly vandalized by 1978, when it was recorded.

The recent history of the area emphasizes three major undertakings which affected the region during the 1930s and 1940s. The first of these, the Los Angeles Aqueduct, resulted in the temporary housing of several thousand workers in the area adjacent to Hayfield Spring. Remnants of their camps are still extant. The second, the California-Arizona Maneuver Area (CAMA), developed under General George S. Patton as a desert warfare training center during World War II, is also still recognizable. Both of these engineering projects, while regionally significant, impinge on the current project area only incidentally and any possible associated remains would be unaffected by the implementation of the project. A subterranean segment of the Aqueduct crosses underneath the Kaiser industrial railroad and the Kaiser truck road in Section 7, Township 4S Range 15E. Nothing identifiable associated with CAMA activity was located during the survey.

The third event is the mining of the iron deposits in the Eagle Mountains and the building of the Kaiser industrial railroad, which is the subject of this report. A number of individuals were helpful in providing information concerning this event.

The absence of formally recorded historic sites was not taken to indicate an absence of historical period cultural activity in the survey area. At the suggestion of Bureau of Land Management personnel, interviews were arranged with Mr. Joseph Chiriaco of Chiriaco Summit and Mr. Stanley Ragsdale of Desert Center. Both of these gentlemen have resided in the area for more than 50 years, and their recollections of activities in the area prior to opening of the Kaiser mine were very helpful. A wealth of information concerning the activities of the mine, including the period prior to the commencement of actual mining operations, was provided by Mr. Orlo Anderson, the mine manager for Kaiser Steel Resources and by Mr. Jerry Stokes, the Kaiser facilities manager.

3. Summary of Ethnographic Research

Since the proposed project crosses lands which were once controlled by currently identifiable groups of Native Americans, definition of the concerns of these Native Americans were of crucial interest. After consultation with Bureau of Land Management (BLM) personnel, an ethnographer whose research among the Native Americans of the area spans more than two decades was selected to solicit input from these Native American groups. The ethnographer is Dr. Lowell

John Bean and he was assisted by Mrs. Sylvia Vane. The results of their inquiries are appended to this report as Attachment 3.

C. HISTORY OF THE KAISER EAGLE MOUNTAIN IRON MINE

The story regarding the discovery of iron in the Eagle Mountains has all the qualities of a frontier legend. The following account is taken verbatim from a story by John Hilton, in the March 1949 issue of *Desert Magazine:*

> Sometime prior to 1881, a prospector named Joe Torres left Needles, California, for a prospecting trip. Joe knew the waterholes so well that he did not follow the established trails, but headed off across country on a fairly direct route to Mecca, prospecting the adjacent mountains as he went along.
>
> As he neared the the east end of the Eagle mountains one afternoon he crossed a ridge covered with huge boulders of iron ore. Joe wasn't interested in iron. He was after gold or silver.
>
> Suddenly the burro balked, with its feet planted on the flat top of a buried mass of iron ore. The animal refused to budge and Joe was puzzled. Jinny had never done this before on the dry hard mesa. She did have a great fear of mud or soft sand along the Colorado river and had given him some trouble in such spots. But here on a dry stretch of desert such obstinacy was beyond understanding. Joe tugged on the rope but Jinny wouldn't move. Then he got behind and pushed and used some language that was not too complimentary, but there was still no action. Jinny just stood rooted to the spot staring at her front feet - picking up first one and then the other and looking at it. Joe got out his prospecting pick and struck the black rock that seemed to be puzzling his traveling companion. It was hard and tough, but a few chips broke off. Amazingly, the fragments, instead of flying away as they should, were drawn back to the mother rock and stuck there. The rock was magnetic! The burro had iron shoes and there was a sticky feel under her feet which had her puzzled and frightened.
>
> Joe found that his pick would stick to the rock. Here was a curiosity that he should take with him to civilization, otherwise, no one would ever believe his story. The rock under Jinny was too big to take away so he began looking about him. He learned that although the black boulders looked alike, they were not all magnetic. It was some time before he located a piece which would attract his pick and was small enough for him to handle. Jinny, her curiosity finally satisfied, had meandered off and was contentedly munching a bunch of galletta grass.
>
> Several days later Joe and Jinny halted in front of the general store in Mecca and Joe unlashed a heavy black rock from his pack and stumbled up the steps with it. Jinny sighed with relief. Her curiosity had certainly increased her burden! Joe traded the curio to the storekeeper for some grub and the stone with nails and other metal objects clinging to it, rested on the store counter for many years.

Although Joe Torres was indisputably the first to make note of the magnetite deposit, he filed no claims. This was not the case with the next individual who encountered these resources.

Jack Moore left Banning on a prospecting trip in the fall of 1881, arriving in the Eagle Mountains by a circuitous route. On the first of November, he staked a claim on the iron deposit and returned with samples. Moore filed additional claims for gold and silver, recording these as well as the iron claim on December 1, 1881, and January 3, 1882. With his father and two others as partners, they organized the Eagle Mountain Mining District. But the group failed to keep up the assessment work necessary to validate their claim, and a new claim on the deposit of iron was filed by L. S. Barnes of Mecca, California.

Barnes had studied at the Colorado School of Mines and recognized the richness of the deposit from the original Torres' sample at the Mecca general store. He relocated the older Moore claims, determined that they had lapsed, and in 1895, began a process of consolidating the claims under his control. By 1912, Barnes had completed the project, and the next legend concerning the Eagle Mountain Iron Mine was about to be born.

Barnes' plan was to sell the consolidated claims on the ore to Henry E. Harriman, chief executive officer of the Southern Pacific Railroad. Harriman, despite his primacy in the railroad business, was at the mercy of the Steel Trust, led by J. P. Morgan's U.S. Steel. Barnes felt that by gaining ownership of the Eagle Mountain iron deposits, Harriman could use the threat of building his own steel industry on the West Coast as a lever to bring down the price the eastern steel interests were charging his railroad for rails. Harriman, according to the story, saw the worth of Barnes' idea and wrote him a check for the full asking price of $1,512,000 on the spot.

Whether Harriman felt that the idea of a West Coast steel industry was feasible or whether he was running a gigantic bluff is not recorded. But he did buy a steel mill site in San Pedro, California, and caused a rail spur to be surveyed. And the price charged to the Southern Pacific for rail by the eastern steel companies dropped dramatically. Harriman died before revealing his true intentions, and no action to develop the iron deposits was taken until World War II sparked the demand for steel in huge amounts (Hilton 1949; Belden 1964a).

During this period, the Joshua Tree National Monument was created and at first included the Eagle Mountain ore deposits. Within the confines of the monument, mining was forbidden.

At this point, Henry J. Kaiser entered the picture. Kaiser, initially a road contractor but more recently a member of the construction consortium which had built the Hoover and Bonneville dams, was building ships for the Navy and Merchant Marine on the West Coast. He needed steel. Already the owner of a steel mill at Fontana and iron ore from the Vulcan mine near Kelso in the Mojave Desert, he was able to convince the Harriman heirs to sell the Eagle Mountain claims. But there was one condition insisted upon by the heirs. All of the ore from the mine had to be shipped over the Southern Pacific Railroad.

This left Kaiser with two problems: he owned rights to a deposit of ore that he was not legally able to mine and he was required to move the ore over a railroad some miles away from the mine. A third problem temporarily surfaced when Harlan Bradt revealed that he held leases to some of the deposits. After a legal struggle, Kaiser attorneys succeeded in having Bradt's claims dismissed, leaving only the problem of the mining prohibition and the railroad.

Kaiser solved the prohibition problem by exerting sufficient political force to have the monument boundaries adjusted to meet his needs. Also, he decided to build a railroad of his own to connect with the Southern Pacific (Belden 1964b).

This work commenced in 1944, with surveyors identifying three possible routes. The first of these went over Shaver's (now Chiriaco) Summit to Indio, the second went down Box Canyon to Mecca, and the third down Salton (or Salt) Creek wash to meet the Southern Pacific at Duramid. The choice was determined by the need to limit the maximum grade with which the ore trains would have to contend to two degrees. This criteria favored the Salton Creek wash route, and after some difficulties in obtaining the right-of-way from the owners, construction began in August of 1947. The Kaiser Industrial Railroad was completed on June 23, 1948 (Backman 1949) and began regular ore shipments to the Fontana, California, mill.

With all of the elements in place, the mining operations continued to develop, and by 1971, the Eagle Mountain Iron Mine was the principal source of iron ore in California and accounted for over 90 percent of the state's iron production (Bureau of Mines 1971).

After 35 years of operations, changing economic conditions forced the suspension of mining activity in November 1982, and shipping ceased in April 1983 (Anderson, personal communication 1989). During the time that active ore extraction was ongoing, the Kaiser Eagle Mountain Iron Mine was the largest single private employer in Riverside County, with a work force of over 4,000.

Caring for this emerging community led to the construction of a company town at the mine site, with houses built by Kaiser and rented to the employees. Schools, fire, police, and recreation facilities were all established, and before cessation of mining operations, accommodations available in the town at the mine consisted of 416 houses, 185 trailer spaces, 383 dormitory rooms, and 32 apartments (Kaiser Steel Corporation 1981).

The decline from this peak of activity was rapid. By the end of 1983, only three employees remained at the mine site. Many of the houses had been purchased by outsiders and relocated, and others were left vacant, inviting vandalism. Gradually, the company increased the security and maintenance work force, which stands at over 20 individuals today (Stokes 1989). The school remains open, serving the surrounding region.

A privately run, low-security penal institution, the Eagle Mountain Return-to-Custody Facility, currently leases a portion of the town area, where it houses parole offenders. A few houses are rented to individuals who work in Desert Center and other neighboring communities.

III. FIELD INVESTIGATIONS

A. SURVEY CRITERIA

The objective of the survey was to provide a complete inventory of the cultural resources located within the boundaries of the project area. Where cultural resources were located, they were to be evaluated to determine their eligibility for the National Register of Historic Places.

1. Prehistoric Cultural Resources

Prehistoric cultural resources, at their most basic, consist of the artifacts and features which are the material remains of the Native American peoples who exploited the survey area prior to contact with the Europeans. Artifacts and features may occur in groups or as single occurrences. Groups of artifacts which are presumably related to each other and are found in surface densities equaling three items within a 25-meter radius or greater are generally recorded as sites, while artifacts found in surface densities less than three per 25-meter radius are recorded as isolates. Features are usually recorded as sites even though they occur singly. Cultural resources, either sites or isolates, must be recorded with the appropriate clearinghouse even if they fail to meet the stringent National Register criteria. All prehistoric cultural resources (sites and isolates) discovered during the survey were recorded.

2. Historic Cultural Resources

The material remnants of past lifeways are valuable to complete the picture of activity in the survey area even where a written record is available. As discussed in the Cultural Background section of this report, the historic period in the Colorado Desert is largely unwritten. Archaeological investigations are the principal remaining data source to bridge this gap in the historical record.

Placing a dividing line between what is or is not "historic" is an admittedly arbitrary procedure. For the purpose of this survey, the year 1939 was selected, for two reasons. First, anything demonstrably later than 1939 would be subject to more stringent eligibility rules for inclusion in the National Register solely due to being less than 50 years old, and second, the Eagle Mountain Mine and Kaiser industrial railroad, as industrial entities, are more recent than 1939. Since the mine and railroad both exemplify modern industrial technology, have been continuously modified, and were fully functional when idled by economic considerations, classifying such a complex or portions of it as "historic" is not expressly within the National Register criteria.

B. SURVEY METHODOLOGY

The Specific Plan area encompasses 4,659 acres at the Eagle Mountain Mine, much of which has been badly disturbed by past mining activities. The disturbance is so pervasive that any cultural resources which may have once existed on this portion of the property have been either carried away with the ore or covered by tailings piles, which in some instances are hundreds of feet thick. These disturbed areas were omitted from the survey.

In addition to the area surrounding the mine itself, 1,500 acres of sectioned land adjacent to the Kaiser Industrial Rail Road, a 200-foot-wide corridor along the 52 mile length of the railroad, and a 200-foot-wide corridor along the Kaiser Truck Road were also surveyed.

The topography varies from level, open desert to mountain slopes in excess of 100 percent. Given this diversity of terrain, it would not be reasonable or even possible to subject all parts of the project area to the standard archaeological survey pattern of parallel transects at a predetermined spacing. The undisturbed areas fall into three categories:

1. Mountain slopes, ridges, and intermontane saddles.

2. Relatively open, level desert.

3. Rail and road right-of-way.

For each of the above area types, different survey methods were employed:

1. Mountain Slopes, Ridges, and Saddles

Of the three types of terrain, the mountains and connecting saddles were the most difficult areas in which to maintain survey integrity. Access by even four-wheel-drive vehicles was denied by the deliberate placement of tailings piles across the mouth of every drainage. This barricade policy was instituted by the Kaiser Iron Mine to prevent access to these areas by mine workers (Stokes 1989), and the barriers work well. In order to reach the areas unscarred by mining activity, RECON survey crews usually found it necessary to climb the ridge face, traverse the spine, and then descend into the adjacent valley. While climbing, the survey teams were alert to detect the residue of prehistoric quarrying, as well as examining natural niches and overhangs for evidence of the type of caches which have been found in somewhat similar terrain to the west. The steepness of the terrain and the absence of water argue that any use of these mountains by aboriginal peoples must have been temporary, and expectations were that if prehistoric artifacts were discovered, they would be indicators of transhumance.

If the expectation of finding evidence of prehistoric activity on the slopes was low, this was counterbalanced by high hopes of locating evidence of the early historic mining period (prior to 1940). The entire surface of the project area is covered with cairns and posts which mark the various claims which have mostly passed into Kaiser Steel ownership over the years. The typical claim marker consists of a rock cairn one to two feet high, which supports a four-by-four timber some three to four feet high. The post is topped by a copy of the claim notice folded into a screw-top jar and secured to the top of the four-by-four. Exposure to sunlight over the years has rendered the claim notice forms so brittle that unfolding the paper in order to determine the age and ownership of the claim was not possible without destroying the document in the process. Apart from these claim markers, only modern litter remains to indicate that these steep slopes are ever visited.

The ridge tops were searched along their length, with special attention being given to possible rock alignments which may have been created by human activity. Also, the game trails, which from the evidence of droppings were created and are still frequented by bighorn sheep, were given special scrutiny for evidence of Native American use.

In several instances, relatively level saddles connect two adjacent peaks within a ridge system. These saddles are effectively shielded from the persistent winds and provide a location suitable for a comfortable dry camp. Each saddle was carefully checked for any evidence of such activity, either prehistoric or historic.

At the base of the steeper ridges, narrow drainages serve to rapidly remove the scant precipitation that does fall on the project area. Even though the project had received a substantial rain less than three weeks before the survey, no standing water was observed. Nonetheless, each of these drainages was examined for signs of cultural activity.

Archaeological visibility on this type of terrain is unparalleled. There is literally no soil cover, and the vegetation is accordingly sparse. The natural surface of the rock is patinated to a dark reddish brown, and flake scars, whether natural or man-made, stand out clearly. Modern trash, such as beer and soda cans and paper food wrappers, is easily detected at ranges measured in tens of meters. Any anomaly caused by cultural activity would be immediately apparent. The absence of cultural material reported by the survey party can be taken with confidence as a valid representation of an apparent absence of cultural activity within the project area. Specifically the absence of cultural activity which produces archaeologically discernable by-products.

2. <u>Open, Level Desert</u>

This type of terrain was located in two areas within the larger project area. Most of the land scheduled to be transferred to the BLM as part of the project falls into this category; as does the area at the mine along the eastern project border. Here the landform is such that a parallel transect approach is appropriate and effective. The survey crew, operating in teams of two to four people, walked approximately 15 to 20 meters apart over the parcel.

Archaeological visibility in these areas was excellent, though anomalies, whether artifacts or modern litter, were not so obvious as in the mountains. The vegetation is typical of the Lower Sonoran community, with occasional palo verde rising 15 to 20 feet above the sparse creosote scrub. Survey team members had no difficulty maintaining orientation throughout each transect, easily keeping the other team members in sight. When necessary to give an area a stricter scrutiny, the entire team stopped until all were ready to proceed.

Expectations for the desert areas were fairly high, as this type of topography was the least disturbed of any encountered within the project boundaries. That more remnants of cultural activity were not located in these areas can be explained best in terms of transitory, ephemeral use by both prehistoric and historic period desert travelers. Given the arid conditions and lack of exploitable resources, habitation sites are unlikely. Since the surveyed parcels did not include any areas where water was reliably available, with the exception of the Salt Creek and Hunter's Spring drainages, the lack of sites is somewhat understandable.

Can and bottle remnants are found scattered over the surface everywhere. Most cans and bottles are obviously modern litter and appear to have been transported to the area for the purpose of target practice. Some isolated bottles and cans may be considerably older, but no cans or bottles that were demonstrably older than circa 1950 were identified within the parcels surveyed.

3. Rail and Road Ways

The right-of-way for the Kaiser Industrial Railroad has its southern terminus at Ferrum, on the northeast shore of the Salton Sea, where it joins the Southern Pacific. From this point the line trends northeast through the pass between the Oricopa and Chocolate mountains, turns northward to pass between the Oricopa and Chuckwalla mountains, and then resumes its northeast direction after crossing Interstate 10. Skirting the eastern flank of the Eagle Mountains, the orientation of the right-of-way slowly backs around to the northwest as it approaches the mine. The 2 percent limitation on grade imposed by the fundamental design of railways ensures that, for all of its 52-mile length, the terrain within the 200' survey corridor will be essentially level.

Construction of the roadbeds entailed scraping away the natural soil for at least 20 meters on either side of the edge of the road and/or rail line (Backman 1949). The undisturbed portion of the 200-foot- (61-meter-) wide survey corridor through which the Kaiser Industrial Railroad passes is reduced by this disturbance, as well as by the nearly 10 meters occupied by the track bed itself, to a strip less than five meters wide on each side of the tracks. This severe and ongoing degradation of the natural land surface has been further aggravated by the jeep trails which have been created by railway maintenance crews and private off-road vehicles. These trails, which allow access to the railway and adjacent lands, are marked by the deposit of modern litter along their margins.

The description of the condition of the rail line applies equally to the right-of-way for the Kaiser Truck Road, with the additional disruptive factor of a parallel electric power line. The truck road was at one time paved along its entire five-mile length, but the cumulative effects of the environment and the lack of maintenance have reduced the southern two miles to a rough track, and the connection, just south of Victory Pass, with Eagle Mountain Road has been deliberately severed and blocked.

Because the Kaiser Truck Road is tentatively scheduled for realignment, the survey area was enlarged to include the area through which it might be rerouted.

To survey these rail and road rights-of-way, the archaeological field crew was divided into two-person teams, one on each side of the centerline, in the center of the lesser disturbed area which fringes the right-of-way. One team would commence and the other team would drive the vehicle ahead for a specified distance, usually two miles. Two miles were selected as the estimated distance that a survey team could cover in one hour. The second team would then park the vehicle and survey in the same direction as the first team. When the first team reached the vehicle, they would move it forward an additional two miles; thus, the two teams would leapfrog along the right-of-way. This method was selected as the most efficient use of assets, since it minimizes overlap and dead time while ensuring 100 percent coverage.

The width of the undisturbed strip alongside the road and rail ways averaged less than five meters, and there were no adverse environmental conditions which would have obscured artifacts or features from view.

IV. SURVEY RESULTS AND ANALYSIS

A. SURVEY RESULTS

The results of the survey verified that very little evidence can be found to support any contention of intensive exploitation of the project area by either Native Americans or settlers prior to 1940. There is always the possibility that such exploitation occurred and that the evidence has been subsequently erased by either natural forces or post-1940 human activity or both, but this is not felt to be probable. That this area was visited on an intermittent basis by both Native Americans and Europeans prior to 1940 is without a doubt the case, however the paucity of material remains testify to the brevity of such incursions.

1. Eagle Mountain Iron Mine Including BLM Exchange Lands

No evidence of prehistoric cultural activity was discovered by the survey team either within the Eagle Mountain Mine area or within the BLM exchange lands area. Pre-1940 cultural activity was undoubtedly present, but the degradation of the natural landscape, which is the natural consequence of open pit mining techniques, is so extensive that no evidence survives. This is known to have occurred in the case of Briest's camp, a miner's camp dating from the 1920s, which is now covered by tailings pile T-6 (Stokes, personal communication, 1989; Ragsdale, personal communication, 1989). Ragsdale remembers additional small mining camps in the vicinity of the Eagle Mountain mine, but none located within the project area. Most of the independent mining activity appears to have been west of the current project boundaries, in the vicinity of the Black Eagle and Iron Chief mines. Stokes confirmed this, adding that some remnants of these early mining camps are still evident.

2. Kaiser Exchange Lands

The parcels of land along the rail right-of-way which are scheduled to be transferred to BLM jurisdiction, were, with the exception of nine isolated artifacts, devoid of evidence of prehistoric activity. Three of the five isolates are individual flakes found in the surveyed portion of Section 21, Township 6 South, Range 14 East, about three miles south of Interstate 10. The fourth was a single flake found in Section 20, Township 8 South, Range 11 East. Four additional flakes were located in Sections 8 (Township 6 South Ranch 14 East), Section 13 (Township 7 South Range 13 East), Section 22 (Township 13 South Range 11 East) and Section 33 (Township 6 South Range 14 East). The remaining isolated artifact is a single sherd of Native American pottery, found in the approximate center of Section 27, Township 5 South, Range 14 East, in a wash descending from Difficult Canyon. These isolated artifacts have been recorded with the clearinghouse at the Archaeological Research Unit, UC Riverside (see Attachment 2).

The same area, Section 27, also contains a trash scatter of possible pre-1940 origin, located some 30 meters northeast of the site where the sherd was found, on the margin of the same wash. Three bottle fragments of purple glass were located in Section 27 just south of the railroad.

No other cultural materials other than obviously modern litter were located on any of the other exchange parcels.

3. Road and Rail Ways

The record search (see Attachment 1) indicated that Riv-3216 was located inside the corridor to be surveyed; however, this site was not relocated despite a careful search of the described location. The failure to relocate Riv-3216 is surprising in two regards: first, visibility in the area is excellent, and second, the description of the locational reference landmarks which are readily apparent. Nonetheless, there is no deposit of cultural material within the 200-foot right-of-way at the intersection of the rail line and the Imperial Irrigation District 230-kilovolt power line. The site record filed by D. Pinto of the Archaeological Research Unit at UC Riverside indicates that the "artifacts appear to be washing downhill," and it is possible that the two additional rainy seasons which have passed since Pinto's survey have resulted in further migration of the material which she located, to the area outside the narrow confines of the present survey corridor.

Close to the reported location of Riv-3216 there is a previously unrecorded locus of prehistoric cultural material, consisting of both chipped and ground stone artifacts and pottery sherds. This site, recorded as Riv-3798, is located 600 meters southwest of (and uphill from) the mapped position of Riv-3216. A site record form (DPR-422) for this site has been filed with the Archaeological Research Unit at UC Riverside (see Attachment 2). One hundred thirty-seven identified surface artifacts, consisting of Native American pottery sherds, stone tools, and lithic debitage, were mapped in situ (Figure 6).

What currently exists of the site is located on two sides of a railroad cut which has removed the center of the site. The railroad tracks and associated debris resulting from periodic repair (railroad ties, metal stakes, and metal) lie at the base of the 10-meter cut. A 3 to 5-meter high and 8-meter wide excavation backdirt pile of pink clay subsoil lies 6 meters southeast and paralleled to the southeast edge of the railroad cut. The eroded remains of a road track are located 14 meters from the edge of the northwest slope.

The 137 mapped surface artifacts were located on either side of the railroad cut, from the edge of the top of the cut to a distance of approximately 40 meters on the northwest and 23 meters on the southeast (see Figure 6). The mapped surface artifacts within this area were collected at the time of the initial survey. Field archaeologists felt the collection of this material was appropriate because the land was considered to be privately owned. Because of the mixed land ownership patterns of the area, it was not realized at the time of the survey and collection that the site was located on federal land and would require consideration under the Section 106 consultation process. A controlled surface collection was conducted. Each of the 48 surface plots references one individual lithic artifact or cluster of from 2 to 9 potsherds. A catalog of the recovered material and associated computer analysis sheets are included in Attachment 4. During the visits to the site, additional cultural materials were

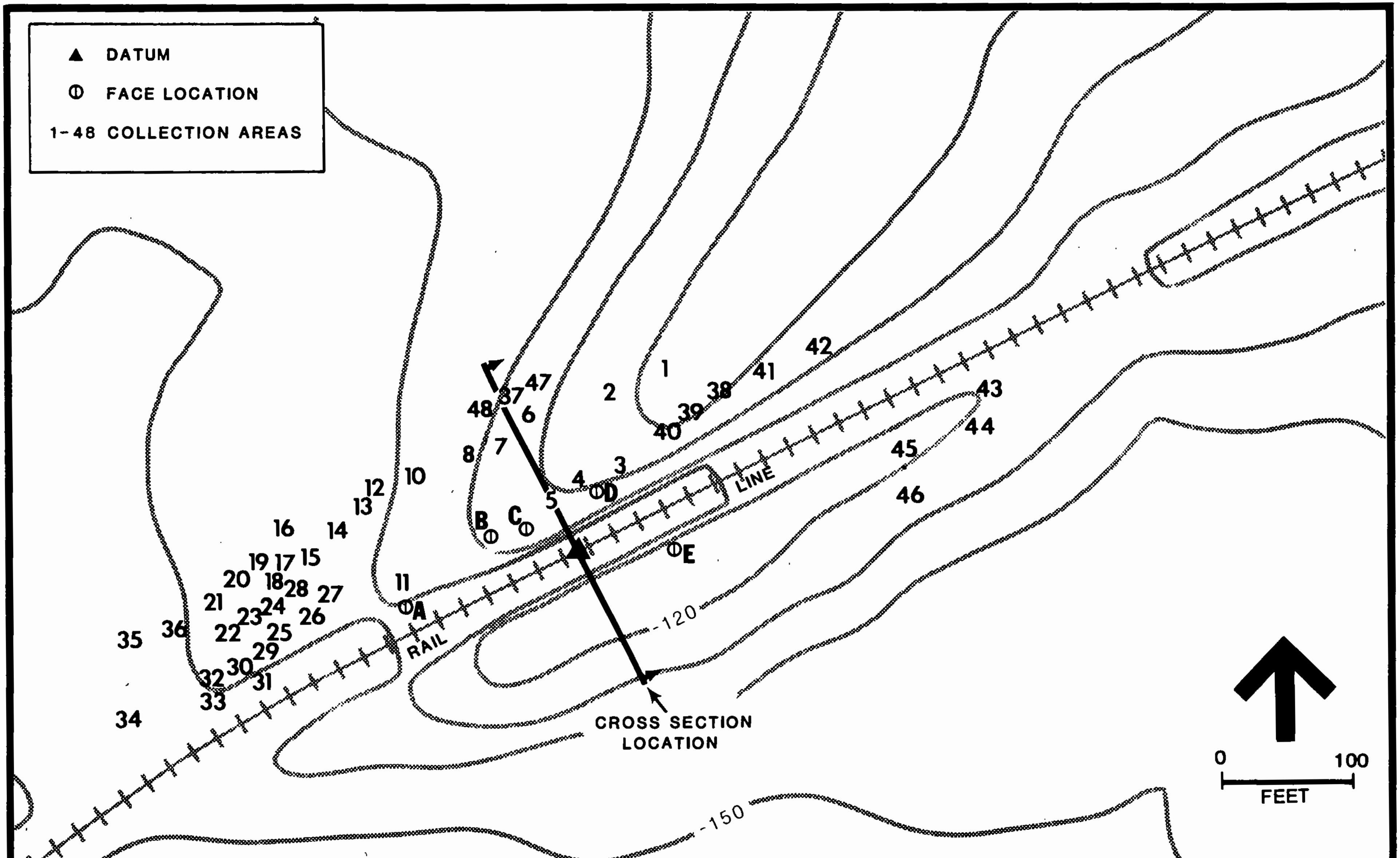


FIGURE 6. Riv-3798 SITE MAP

RECON

observed at a distance of approximately 45 meters to the southeast on the far side of the backdirt pile which resulted from the excavation of the railroad cut.

A subsequent field visit to the site was conducted to obtain additional documentation regarding the nature of the stratigraphy at the site and to assess the potential for additional surface or subsurface cultural materials. A cross-section portraying the extent of the road erosion, railroad cut, and the backdirt pile, was reconstructed using transit and stadia rod (Figure 7). At five locations along the railroad cut slope (four on the northwest slope and one on the southeast slope), a clean face was cut to provide a detailed profile of the stratigraphy. This approach was discussed with Garth Portillo of the BLM Riverside office prior to the field visit. The locations of the faces are shown in Figure 6.

The soil profile observed in face D is shown in Figure 8. The four profiles observed in the northwest faces showed remarkable similarity in strata. The top stratum consists of a layer of sandy topsoil. As would be expected in a deflationary situation, this layer is progressively thinner as the top of the knoll is approached. The topsoil stratum is approximately 2 centimeters thick in face D (at the top of the knoll), and approximately 20 centimeters thick in face A (approximately 150 feet from the toe of the knoll slope). One potsherd was found in the topsoil stratum at face D, within two centimeters of the surface.

As can be seen in Figure 8, the remaining strata (from the surface to approximately 44 centimeters below the surface) consist of reddish/brown clayey sand, fine gray sand, coarse gray sand and small angular stone, fine gray sand, fine reddish brown sand, and fine dark gray sand. These observed soil strata reflect the lakebed depositional origins of the area. They extend to within 2 centimeters of the surface, and represent an absolute limit to the potential extent of any cultural materials.

The remaining face (E) was cut on the southeast slope. This area has been additionally disturbed by extensive erosion caused by the runoff from the backdirt pile of pink clay subsoil just to the southeast. The top 20 centimeters of this face consisted of the redeposited pink clay subsoil, the remaining 40 centimeters consisted of a grey/brown sterile sand.

A thorough resurvey of the site area (approximately 75 meters to the northwest and southeast of the railroad tracks, approximately 300 meters to the northeast of the site datum and approximately 120 meters to the toe of the knoll slope on the southwest) was conducted. Two additional potsherds and two flakes were observed within the previous surface collection area north of the railroad tracks. A widely dispersed scatter of potsherds was observed on the southeast side of the pink clay backdirt pile. This scatter has been heavily impacted by erosion caused by the runoff from the backdirt pile.

One additional disturbance factor at the site is the erosion down the slopes of the knoll which has been intensified by the railroad cut excavation, the placement of the backdirt pile, and an old road north of the railroad cut. The site revisit was conducted within four days of heavy rains which caused Salt Creek to wash out the access road which leads to the site. Additional erosional rills and cuts at the edge of the railroad cut along the road

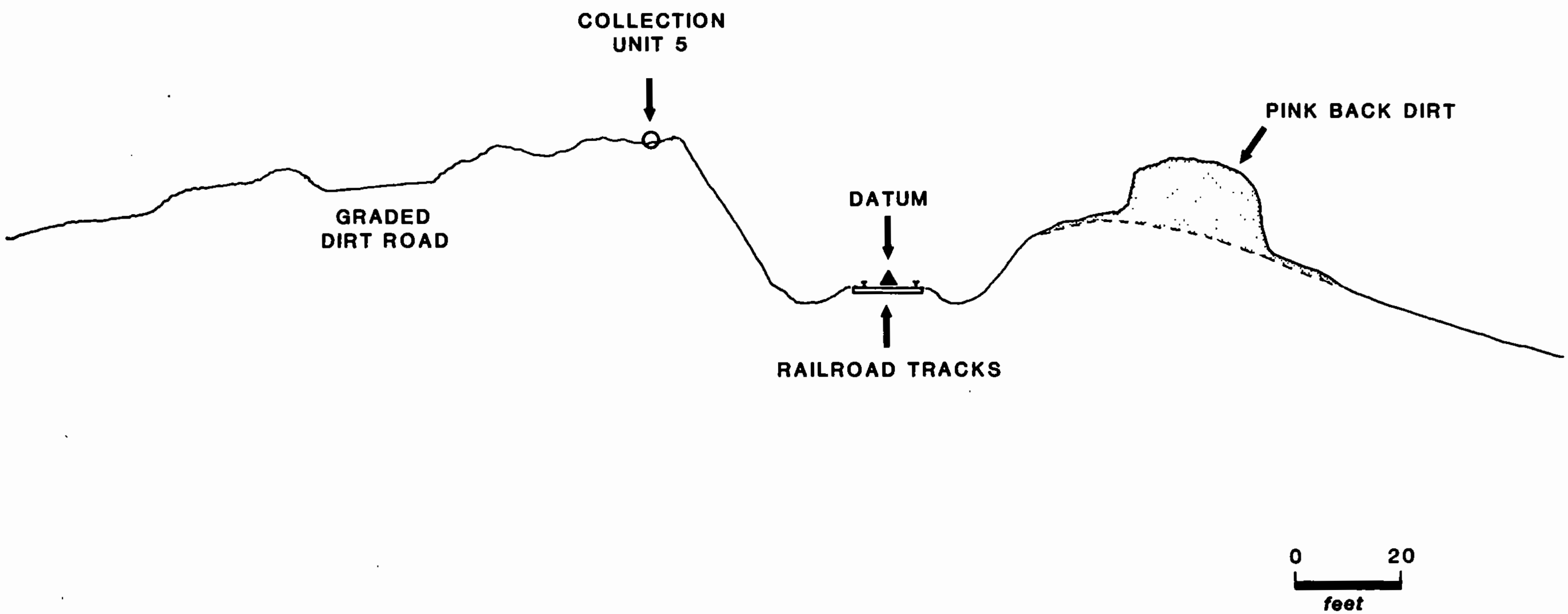


FIGURE 7. Riv-3798: CROSS SECTION OF RAILROAD CUT

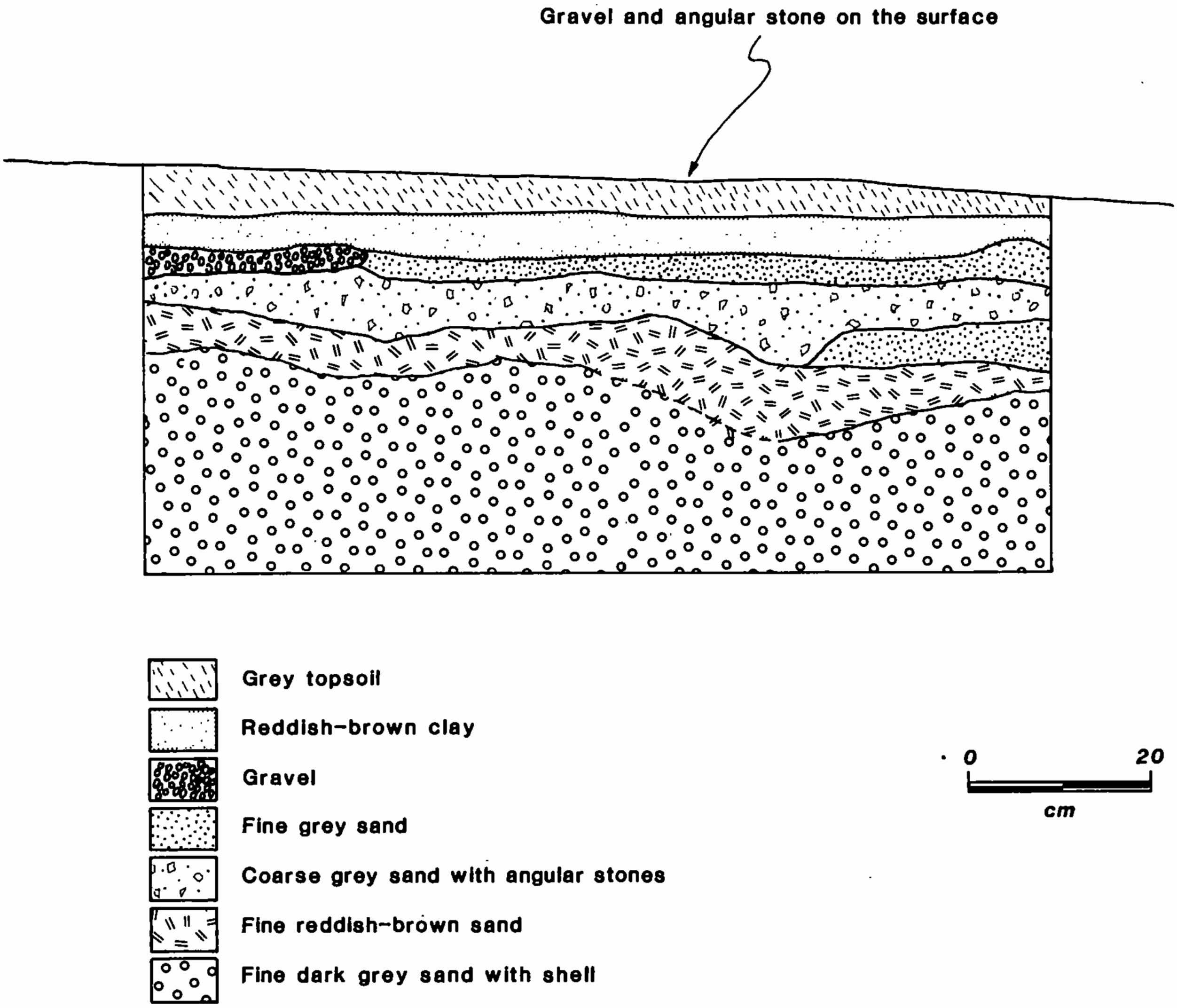


FIGURE 8. Riv-3798: PROFILE OF FACE D

remains northwest of the railroad cut, and on the northwest and southeast slopes of the backdirt pile and adjacent land surface were observed.

As a result of the initial survey activities and the subsequent site documentation visit, it was demonstrated that no subsurface site remains exist along the railroad cut. It was also demonstrated that the site is seriously damaged by the excavation of the railroad cut, an old road, the placement of a backdirt pile, and erosion. Additional surface artifacts were found southeast of the backdirt pile, and these also are disturbed by erosion.

Riv-3798 was the only location within the two rights-of-way where an artifact concentration was found. In addition to Riv-3798, four isolated flakes were identified along the right-of-way (see Attachment 2).

No historic sites were located within this portion of the project area. Although there is a profusion of cultural debris lightly scattered along the rail line and roadways, most of it is recognizable as modern debris (the ubiquitous Budweiser can) and none of the material can be positively dated as pre-1940.

In summary, the survey revealed scant evidence of either prehistoric or historic cultural activity. Part of the reason for this is the inhospitable nature of much of the terrain with its concomitant lack of reliable water and exploitable natural foodstuffs. Additionally, much of the southern part of the Kaiser Rail Line lies below the 12 meter high stand of prehistoric Lake Cahuilla. Throughout the transgression/regression cycles of the lake, sites in this zone are likely to have been seriously affected by washing and siltation.

In all likelihood, the Native American population in the region was small and mobile. Historic use of the lands was limited to travelers and miners. The travelers apparently left as little concentrated cultural debris as the Native Americans, and the evidence of the early miners' activities has been obscured by later industrial mining operations. Construction of the modern road and rail facilities to serve the industrial mining operations may have similarly destroyed the evidence of preexisting culture along the rights-of-way. The lack of observable cultural material is felt to be a reliable indicator of the lack of such activity there.

B. ANALYSIS OF FINDINGS

1. Riv-3798

As described above, the site is bisected by the Kaiser railroad cut which, along with an old road, a backdirt pile, and erosion, constitutes a major disturbance to the resource, compromising its research potential.

The site was shown to consist of surface artifacts only. This was confirmed through documentation of faced profiles of the railroad cut. There is no evidence that subsurface remains exist at the site.

The overall impression of this site is that the assemblage represents a disrupted remnant of a temporary camp, probably occupied briefly by a hunting and gathering party, possibly during the Protohistoric (Moratto 1984:424-430) period as defined in the Cultural Background section of this report. The relative profusion of pottery in the assemblage justifies this temporal assignment. The portable milling equipment (mano and metate) and the presence of both hunting and processing lithic tools contribute to the assessment. The area close to the site is marked on the USGS map as a seep, and although the survey party did not see any signs of surface water, the seep may have been an exploitable water source in past times.

a. Pottery. One hundred twelve sherds were located at the site. An inventory and analysis of recovered sherds is included in Attachment 4. The potsherds were analyzed based on the method developed by Waters (1981). The identification was verified by comparison with two San Diego Museum of Man reference collections: one assembled by Malcolm Rogers and one by Michael Waters. The majority of the sherds were typed as Salton Buff, a minor amount as Colorado Beige; no brown wares were present.

One hundred four sherds (773.1 grams) were identified as Salton Buff. Waters (1981) attributes Salton Buff to the period between A.D. 1,000 and A.D. 1,500, "based on its geological association with Lake Cahuilla and carbon 14 dates from shoreline sites (Waters 1981:22)." The type is associated with Patayan II (within the Late Cultural Sequence as defined above). It was "manufactured" along almost the entire 12 meter shoreline of Lake Cahuilla (Waters 1981:20). The classification of sherds was based on identification of rim forms, together with clay material, inclusion, and temper constituents (Waters 1981). Riv-3798 is within the geographic range for Salton buff.

Eight sherds (171.5 grams) were identified as Colorado Beige, primarily based on the presence of the typical direct rim, clay composition, inclusions, temper, and color. Waters (1981) has dated Colorado Beige to approximately A.D. 700-1050 and within the Patayan I period (within the Late Cultural Sequence as defined above). He states, "this type lies along the Colorado River, from north of Blythe south to the Gila River and east along the lower Gila . . . . intrusive as far west as the eastern stand of Lake Cahuilla" (Waters 1981:67).

In addition to type classification, the sherds were measured for thickness and rim curvature, and color-typed using Munsell color charts. Comparisons based on these attributes were made in the attempt to determine if any of the sherds represented portions of the same vessel. If the sherds which were discovered in close proximity were shown to be from the same vessel, this would be evidence that the site was relatively free from post-depositional disturbance. Unfortunately, this was not the case, and no relationships could be demonstrated by this method. Six (5 percent) displayed evidence of contact with fire. Thicknesses ranged from 2 mm to 9 mm. None of the pottery was decorated.

Nineteen sherds (17 percent) were rim fragments. Vessel forms were projected based on the form of the rim sherds (see Attachment 4). The vessel forms were projected based on a method described in Wade (1985). Form names are based on those first described by Rogers (1936) and expanded upon by Waters (1981). Vessel forms represented included: seven bowl rims (radius average 11.5 centimeters), two pot rims (one radius of 9 centimeters and one undeterminable), 1 seed jar rim (radius of 9 centimeters), six jar rims (radius average of 9.6 centimeters), and two direct "chimney" rims for which no determination of vessel form could be made (rim radius of 2.5 and 8 centimeters). This represents a minimum of five vessels.

In general, the ceramic sherds were notable for their homogeneity of type. Based on the typology and chronology developed by Waters (1981), the deposition of ceramics dates sometime between A.D. 700 and 1500, with an emphasis on the period following A.D. 950 based on the preponderance of Salton Buff sherds. Vessel forms represent several activities including storage and cooking. Use of pottery for cooking can also be inferred from evidence of burning on some sherds.

b. <u>Ground Stone</u>. Two items were identified (see Attachment 4). The first is a dark gray tabular granitic material, with one surface polished from use. The roughly triangular fragment measures 200 mm by 120 mm by 30 mm thick. It is classified as a metate fragment. The second item is a mano made from similar material, with one working surface and a pronounced shoulder. It measures 160 mm by 100 mm by 60 mm and weighs 1,359 g.

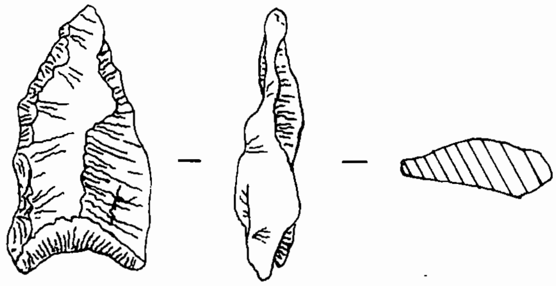
c. <u>Lithics</u>. Two points, four scrapers, and nine pieces of debitage were located (see Attachment 4). Several materials are represented: quartz, chalcedony, and fine-grained metavolcanics.

The two points are illustrated in Figure 9. One is constructed of black metavolcanic and shows some resemblance to the Rose Spring contracting stem type as defined in Heizer and Hester (1978) and Moratto (1984), although larger in size. Rose Spring points are dated to between A.D. 600-700 and A.D. 1100. Using Thomas' procedures for classification (1981), the point would be classified as a Gatecliff Contracting Stem. Thomas proposes a termination date for this series of approximately 1300 B.C. Point types of this variety are not well documented in the literature for the area. Its association with large quantities of Salton Buff provide an interesting potential for future chronological inquiry. This artifact is best described as a square-shouldered, square-stemmed projectile point. Its general size and morphology suggest that it was probably an atlatl dart point, rather than an arrow point.

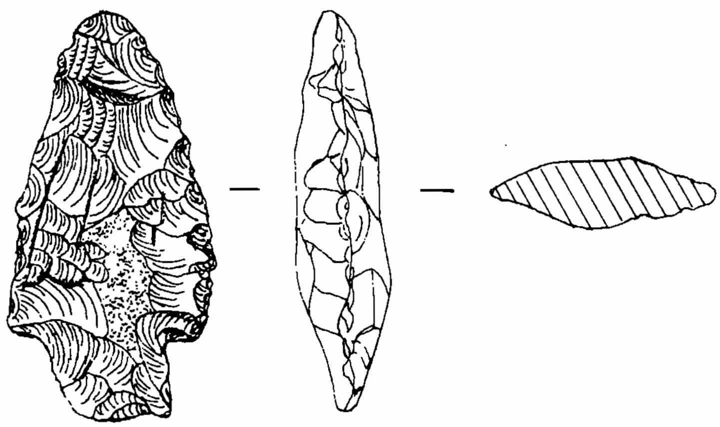
Dart points are not generally associated with late period sites in this region. It has been a general assumption of most prehistorians that the bow was well established in the desert southwest by the time ceramics were introduced (Warren and Crabtree 1986). Comparisons between artifact surface erosion within the assemblage provides some evidence that this projectile point is not associated with the remainder of the surface collections. Under magnification, the dart point shows significant smoothing of all exposed edges and flake scars. None of the other lithics from the assemblage show similar effects.

One possible explanation is that the artifact was curated from a much older site in the vicinity and transported to this location. Alternately, this site may actually represent two distinct components that have been deflated and mixed on the surface. No other evidence for this is provided by the artifacts, however.

The second point is an asymmetrical Cottonwood triangular point of quartz. Cottonwood points date to the Late cultural sequence as defined



210-34



210-44

SCALE TO ACTUAL SIZE

FIGURE 9. PROJECTILE POINTS FROM RIV-3798

above. Heizer and Hester (1978) date the Cottonwood series points to approximately A.D. 1300 to the historic period, within the period with which the Salton Buff ceramics are associated. This particular point is crude in execution, probably due to the poor nature of the material. It is best described as a Cottonwood series triangular base projectile point (Wilke 1974), probably used as an arrowhead.

The flaked lithic artifacts were analyzed based on an attribute system and provided with a traditional morphological label (see Attachment 4). Four scrapers are all made from small pieces of chalcedony, possibly core trimmings, which exhibit nibbling on at least one edge. Each of the four flaked lithic artifacts was analyzed according to attributes of its edges. Attributes were described for each "non-contiguous exclusive, damage event" or NEDE (Wade 1990). Ten NEDEs were described on the four scrapers: utilized only (three instances of nibbling and one instance of microstep flaking) and unifacially flaked and utilized (five instances of nibbling and one instance of microstep flaking). In the second case this edge damage may be partially the result of platform preparation. For all flaked lithic artifacts, the nature of the damaged edges do not reflect use in heavy processing. The limited range of tools and their associated edge damage implies that a limited set of economic activities occurred at the site.

No complete picture of the lithic reduction process on this site is discernible from the small amount of debitage recovered. Four different materials: quartz, quartzite, coarse, and fine-grained metavolcanics are represented among the nine flakes and pieces of shatter. Two of the quartz flakes appear to be bifacial thinning flakes, and were produced from a better quality material than the projectile point. One large bifacial thinning flake of a basalt or black metavolcanic is also present. This material appears to be similar, but not identical, to the material from which the larger projectile point (210-44) is composed. Pressure flaking is evident only on the two projectile points.

As a diffuse ceramic and lithic scatter this site is similar to many other sites within eastern Riverside county. The occurrence of both Salton Buff and Colorado Beige wares at this site seems to reflect general patterns of exchange or movement similar to those found within the Salton Basin. Many of the late prehistoric sites in and around Lake Cahuilla contain ceramic types from several adjacent regions, such as Tumco Buff, Salton Buff, and Tizon Brown ware (Dominici 1987). Co-occurance of these types and various exotic materials suggests that the inhabitants of these sites had either well-established trade connections or large ranges of movement which would bring them into contact with the sources of non-local items.

2. Prehistoric Isolates

a. Section 27 Sherd (EMRR-A). Not classifiable as one of the recognized Desert wares, the fragment is roughly triangular, approximately 50 mm on a side, and weighs 14.5 grams. It shows no evidence of being exposed to fire and bears no decoration or markings. A mixture of both mountain and sedimentary clays was used in the manufacturing process.

b. Section 21 Debitage (EMRR-C, EMRR-D, EMRR-E). The three isolates found on this parcel were all struck from different chalcedony (jasper) cores. All were interior (no cortex) flakes less than 30 mm in length. No inferences were drawn from these isolates.

c. Other Debitage (EMRR-B, EMRR-F, EMRR-G, EMRR-H, EMRR-I). No inferences were drawn from these single flakes. B, F, and G were fashioned of chalcedony; H was obsidian; and I was quartz. No cortex was observed on any of the isolated flakes. The largest of the lot was less than 40 mm overall. No distinguishing attributes were noted by the field team.

3. Section 27 Trash Scatter

The scatter includes approximately 50 cans, some 20 bottles, and other household articles: an enameled cook pot, a kitchen spoon, and a rubber-stamp pad. The diffusion of the scatter along the wash margin and the observation that some of the artifacts were half buried in the sand imply that this is a secondary deposition.

Within the scatter, several bottles and cans were identifiable as to function: mason jars, condiment bottles, liquor bottles, and milk bottles together with evaporated milk, No. 2 1/2 and 303 vegetable cans, and sardine and Spam cans. All cans and bottles were produced by modern methods, and their equivalents are currently commercially available.

Some products were identifiable by brand. Bottles which formerly contained Four Roses Blended Whiskey, Best Foods, and CHB honey; a medicinal product named Knoxall; and a lotion manufactured and/or distributed by A. S. Hinds were found intact. That some of the larger bottles (for example, the one-quart milk and the whiskey) were unbroken stands in sharp contrast to the normal "target practice" assortment of broken bottles evident elsewhere.

The type of materials found in this scatter are suggestive of housekeeping rather than camping or picnicking. During a conversation with Stanley Ragsdale, he mentioned that during the construction of the Eagle Mountain tunnel, as part of the Los Angeles Aqueduct, construction camps were situated at the point where the tunnel exits the Eagle Mountains. Apart from these organized and supervised camps provided by the large construction firms, individual workers camped in the washes below the Eagle Mountains hoping for jobs on a day-to-day basis. These "Stump Ranchers," to use Ragsdale's colorful term, built their shanties out of available resources, principally the substantial wooden crates in which blasting materials were transported.

It is possible that the scatter may represent the residue from one of these habitations, no artifacts capable of providing the requisite terminus ante quem were identified. The deposit cannot be positively dated earlier than 1940, and could easily be as recent as 1960 or even later. Its composition, size, and location suggest strongly that it is not an in situ deposit. Given that the integrity of the deposit is likely compromised by redeposition, that the range of artifacts is narrow, and that no evidence was discovered to date the project within the period of interest, this deposit is not considered to represent a historic resource, and recordation is not appropriate.

4. Section 27 Bottle Fragments

Even though "sun purpling" of glass is indicative of manufacture prior to World War I, the lack of association between the three bottle fragments and any other cultural material makes them useless for cultural analysis.

V. RECOMMENDATIONS

A. Riv-3798

As a result of the documentation it has been demonstrated that no subsurface site remains exist along the railroad cut. It has also been shown that the site is seriously damaged by the excavation of the railroad cut, an old road, the placement of a backdirt pile, and erosion. Additional surface artifacts are located southeast of the backdirt pile, and are also disturbed by erosion.

Actions related to the railroad which will result from implementation of the proposed project consist of transportation of trash along the rail line, rehabilitation of the railroad, and probable replacement of unstable tressels. No tressels exist within the site area. Rehabilitation of the railroad and required maintenance activities will include track straightening and alignment, ballast regulation, culvery cleanout and repair, vegetation control, and oiler maintenance. The proposed railroad rehabilitation activities will not involve excavations or movement of dirt.

No remains of site Riv-3798 are in proximity to the railroad, as the construction of the railroad created an 11-meter cut removing the center of the site. The cut faces documented during the field investigations revealed that no subsurface remains of the site exist in the remaining site area adjacent to the railroad. Therefore, because no project elements would disturb areas outside of the railroad cut, the project would have no effect on the remaining portion of site Riv-3798. No further action is recommended.

B. ISOLATES

1. National Register Assessment

The prehistoric isolates located by the survey fall into the named categories of archaeological sites generally ineligible as defined by the California Desert District of the BLM's Contractor Directives.

2. Recommendation

Recordation of these isolated artifacts has exhausted their potential to aid archaeological research, and no further action is recommended.

C. HISTORIC CULTURAL RESOURCES

No structures, sites, buildings or objects which qualify as historic cultural resources were located during the survey. Thus, assessment for the National Register is not applicable.

VI. REFERENCES CITED

Anderson, Orlo J.
1989 Personal conversation, November 3.

Backman, Frank A.
1949 The Construction of the Eagle Mountain Railway. *Proceedings: The Journal of the Pacific Railway Club* 32(10):11-19.

Bancroft, Hubert Howe
1886 *History of California 1542-1800,* vol. I. San Francisco.

Bean, Lowell J.
1962-1972 Ethnographic Fieldnotes. In *Handbook of North American Indians: California,* vol. 8, edited by Robert F. Heizer. Smithsonian Institution, Washington, D.C.

1972 *Mukat's People: The Cahuilla Indians of Southern California.* University of California Press, Los Angeles.

1978 Cahuilla. In *Handbook of North American Indians: California,* vol. 8, edited by Robert F. Heizer. Smithsonian Institution, Washington, D.C.

Bean, Lowell John, and William M. Mason
1964 *Accounts of the Romero Expeditions in Arizona and California, 1823-1826.* Ward Richie Press, Los Angeles.

Bean, Lowell John, and Katherine Siva Saubel
1972 *Temalpakah: Cahuilla Indian Knowledge and Usage of Plants.* Malki Museum Press, Morongo Indian Reservation, Banning.

Bean, Lowell John, and C. R. Smith
1978 Serrano. In *Handbook of North American Indians: California* 8:570-574, edited by Robert F. Heizer. Smithsonian Institution, Washington, D.C.

Bedwell, Stephen F.
1970 *Prehistory and Environment of the Pluvial Fort Rock Lake Area of South Central Oregon.* Ph.D. dissertation, University of Oregon, Eugene.

Belden, L. Burr
1964a Thar's Iron in Them Thar Desert Hills. *San Bernardino Sun-Times.* February 16.

1964b Kaiser Revived Iron Mines. *San Bernardino Sun-Times.* February 23.

Benedict, Ruth
1924 A Brief Sketch of Serrano Culture. *American Anthropologist* 26(3): 366-392.

Bettinger, Robert, and R. E. Taylor
1974 Suggested Revisions in Archaeological Sequences of the Great Basin in Interior Southern California. *Nevada Archaeological Survey Research Paper* 5:1-26. Reno.

Bureau of Mines, U.S. Department of the Interior
1971 Economic Evaluation of California-Nevada Iron Resources and Iron Ore Markets. Bureau of Mines Information Circular IC-8511.

Campbell, Elizabeth C., and William Campbell
1935 The Pinto Basin Site: An Ancient Aboriginal Camping Ground in the California Desert. *Southwest Museum Papers* 9:1-51. Los Angeles.

Chiriaco, Joseph L.
1989 Personal conversation, November 15.

Davis, C. A.
1981 *Newberry Cave: An Elko Religious Site in San Bernardino County, California*. Master's thesis, Department of Anthropology, University of California, Riverside.

Davis, Emma Lou
1968 Early Man in the Mojave Desert. In *Early Man in Western America*, edited by C. Irwin-Williams, pp. 42-47. Eastern New Mexico University Press, Portales.

1974 Report: Field Work on the Missile Impact Range of the United States Navy, China Lake Weapons Testing Center. China Lake Program-Report No. 1b. Ridgecrest and San Diego.

Davis, Emma Lou, and R. S. Shutler, Jr., with appendix by D. R. Tuohy
1969 Recent Discoveries of Fluted Points in California and Nevada. *Nevada State Museum Miscellaneous Papers* 14(7):154-169. Carson City.

Davis, James T.
1961 Trade Routes and Economic Exchange Among the Indians of California. *University of California Archaeological Survey Report* 54 (reprinted 1974, Ballena Press, Ramona).

de Stanley, Mildred
1966 *The Salton Sea, Yesterday and Today*. Triumph Press, Los Angeles.

Drucker, Philip
1937 Culture Element Distributions: Southern California, vol. V. *University of California Anthropological Records* 1(1):1-52.

Euler, R.
1966 Southern Paiute Ethnohistory. *Anthropological Papers 78*. University of Utah Press, Salt Lake City.

Forbes, Jack D.
1964 The Development of the Yuma Route Before 1846. *California Historical Quarterly* 43(2):99-118.

Grant, Campbell, James W. Baird, and J. Kenneth Pringle
1968 Rock Drawings of the Coso Range, Inyo County, California. *Maturango Museum Publications* 4.

Harwell, Henry O., and Marsha C. S. Kelley
1983 Maricopa. In *Handbook of North American Indians: Southwest,* vol. 10, edited by Alfonso Ortiz. Smithsonian Institution, Washington, D.C.

Heizer, Robert F.
1966 *Languages, Territories and Names of California Indian Tribes.* University of California Press, Los Angeles.

Heizer, R. F., and R. Berger
1970 Radiocarbon Age of the Gypsum Cave Culture. *Contributions of the University of California Archaeological Research Facility* 7:13-18. Berkeley.

Hester, Thomas R.
1973 Chronological Ordering of Great Basin Prehistory. *Contributions of the University of California Archaeological Research Facility* 17. Berkeley.

Hilton, John
1949 Henry Kaiser Came to the Desert for Iron. *Desert Magazine.* March:5-9.

Kaiser Steel Corporation
1981 Internal memorandum. Copy on file at RECON.

King, Thomas F.
1975 *Fifty Years of Archaeology in the California Desert: An Archaeological Overview of Joshua Tree National Monument.* National Park Service, Western Archaeological Center, Tucson.

Kroeber, Alfred L.
1908 Origin Tradition of the Chemehuevi Indians. *Journal of American Folklore* 21(81-82):240-242.

1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78. Washington, D.C.

1976 Report on the Aboriginal Territory and Occupancy of the Mohave Tribe. In *American Indian Ethnohistory: Indians of the Southwest.* Garland, New York.

Kurten, B., and E. Anderson
1980 *Pleistocene Mammals of North America.* Columbia University Press.

Laird, Carobeth
1976 *The Chemehuevis.* Malki Museum Press, Banning, California.

Lanning, Edward P.
1963 Archaeology of the Rose Spring Site, Iny-372. *Publications in American Archaeology and Ethnology* 49(3):237-336. University of California, Berkeley.

Lee, W. Storrs
1963 *The Great California Deserts.* G. P. Putnam's Sons, New York.

May, Ronald V.
1976 An Early Ceramic Date Threshold in Southern California. *Masterkey* 50(3):103-107.

Moratto, Michael J.
1984 *California Archaeology*. Academic Press, San Diego.

Norris, Frank, and Richard L. Carrico
1978 *A History of Land Use in the California Desert Conservation Area*. Prepared for the Bureau of Land Management, Riverside. WESTEC Services, Inc., San Diego.

Ragsdale, Stanley
1989 Personal conversation, November 15.

Rector, C., J. D. Swenson, and P. J. Wilke
1979 Archaeological Studies at Oro Grande, Mojave Desert, California. Report to the Victor Valley Wastewater Reclamation Authority. Riverside.

Rogers, Malcolm J.
1929a The Stone Art of the San Dieguito Plateau. *American Anthropologist* 31:454-467.

1929b Report on an Archaeological Reconnaissance in the Mojave Sink Region. *San Diego Museum of Man Archaeological Papers* 1(1).

1939 Early Lithic Industries of the Lower Basin of the Colorado River and Adjacent Desert Areas. *San Diego Museum of Man Papers* 3.

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167-198. Albuquerque.

1966 *Ancient Hunters of the Far West,* edited by Richard F. Pourade. Union-Tribune Publishing Company, San Diego.

Schroeder, Albert H.
1952 The Significance of Willow Beach. *Plateau* 25(2):27-29.

Schroedl, A. R.
1977 The Grand Canyon Figurine Complex. *American Antiquity* 42(2):254-265.

Shumway, Gary L., Larry Vredenburgh, and Russell Harthill
1980 Desert Fever: An Overview of Mining in the California Desert Conservation Area. In *A Cultural Resources Overview of the Colorado Desert Planning Units*, edited by Elizabeth von Till Warren, Robert H. Crabtree, Claude N. Warren, Martha Knack, and Richard McCarty 1981. Bureau of Land Management, California Desert District, Riverside.

Sigleo, A. C.
1975 Turquoise Mine and Artifact Correlation for Snaketown Site, Arizona. *Science* 189:459-460.

Smith, G. A.
1963 Archaeological Survey of the Mojave River Area and Adjacent Regions. San Bernardino County Museum Association, San Bernardino.

Snyder, C. T., G. Hardman, and F. F. Zdenek
1964 Late Pleistocene Lakes of the Great Basin. U.S. Geological Survey Miscellaneous Geologic Investigations Map I-416, Washington, D.C.

Stewart, Kenneth M.
1947 Mojave Warfare. *Southwestern Journal of Anthropology* 3:257-278.

1983 Mojave. In *Handbook of North American Indians,* vol. 10, W. G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Stokes, Jerry W.
1989 Personal conversation, November 10.

Strong, William D.
1929 Aboriginal Society in Southern California. *Publications in American Archaeology and Ethnology* 26(1):1-358. University of California, Berkeley.

Sutton, M. Q.
1981 Archaeology of the Antelope Valley, Western Mojave Desert, California. In *California Archaeology,* Michael J. Moratto 1984. Academic Press, San Diego.

Swinson, J. D.
1978 An Archaeological Assessment of a Portion of the Southeast Quarter, Section 36, Township 3 South, Range 14 East, San Bernardino Base Meridian, near Eagle Mountain, Riverside County. Copy on file at the Archaeological Research Unit, University of California, Riverside.

Wade, Sue A.
1985 Appendix D, Tizon Brown Ware Analysis. In Broken Fragments of Past Lifeways: Archaeological Investigations at Los Penasquitos Ranch House Resource Area, San Diego. Susan M. Hector and Stephen R. Van Wormer. RECON.

1990 An Archaeological Site Testing Program and Preservation Area Boundary Definition for Site SDi-10,198, Otay Corporate Center North, Otay Mesa. RECON.

Wallace, William J.
1962 Prehistoric Cultural Development in the Southern California Deserts. *American Antiquity* 28(2):172-180.

1977 *Death Valley National Monument's Prehistoric Past: An Archaeological Overview.* U.S. Department of the Interior, National Park Service, Arizona.

1978 Post-Pleistocene Archaeology. In *Handbook of North American Indians: California,* vol. 8, edited by R. F. Heizer, pp. 448-461. Smithsonian Institution, Washington, D.C.

Warren, Claude N.
1980 The Archaeology and Archaeological Resources of the Amargosa-Mojave Basin Planning Units. In *A Cultural Resource Overview for the Amargosa-Mojave Basin Planning Units,* edited by C. N. Warren, M. Knack, and E. Warren, pp. 1-136. Cultural Resource Publications, Anthropology-History, Bureau of Land Management, Riverside.

Warren, C. N., and R. H. Crabtree
1972 The Prehistory of the Southwestern Great Basin. In *Handbook of North American Indians,* vol. 11, edited by Robert F. Heizer. Smithsonian Institution, Washington, D.C.

1986 Prehistory of Southwestern Area. In *Handbook of North American Indians*, vol. 11, Great Basin.

Warren, Elizabeth von Till, Robert H. Crabtree, Claude N. Warren, Martha Knack, and Richard McCarty
1981 A Cultural Resources Overview of the Colorado Desert Planning Units. Bureau of Land Management, California Desert District, Riverside.

Warren, Elizabeth von Till, and Ralph J. Roske
1981 Cultural Resources of the California Desert, 1776-1980: Historic Trails and Wagon Roads. Bureau of Land Management, California Desert District, Riverside.

Waters, Michael R.
1981 In Hohokam and Papayan: An Archaeological Overview of Southwestern Arizona. Edited by R. McGuire and M. Schiffer. Chapter 6: The Lowland Patayan Ceramic Tradition. Tempe, AZ.

Wirth Associates
1977 Plant Site to Victorville/Lugo Devers to Victorville/Lugo. Phase I Regional Study, Archaeological Resources. Manuscript on file at RECON.

VII. PROJECT STAFF

Charles S. Bull	Supervisory Archaeologist
Sue A. Wade	Senior Archaeologist
McMillan Davis	Project Archaeologist
Frank Ritz	Field Archaeologist and Historical Researcher
John L. Whitehouse	Field Archaeologist and Crew Leader (South)
Cheryl Bowden	Field Archaeologist and Laboratory Analyst
Russell Collett	Field Archaeologist
Karen Knight	Field Archaeologist
Carleen Leeper	Field Archaeologist
Carol Schultze	Field Archaeologist
Larry Tift	Field Archaeologist
Loretta Gross	Production Supervisor
Harry Price	Senior Technical Illustrator
Stacey Tomlinson	Production Specialist

ATTACHMENTS

ATTACHMENT 1

Attachment 1

On file at the County of Riverside, Bureau of Land Management (Palm Springs), and RECON.

ATTACHMENT 2

Attachment 2

On file at the County of Riverside, Bureau of Land Management (Palm Springs), and RECON.

ATTACHMENT 3

Cultural Systems Research, Inc.

823 Valparaiso Avenue, Menlo Park, California 94025

(415) 323-9261 • (415) 832-8489

February 27, 1990

Dr. Charles Bull
President, RECON
1276 Morena Blvd.
San Diego, CA 92110-3815

Re: Native American Consultation for Eagle Mountain (RECON Number 2100A)

Dear Dr. Bull:

We are sending you herewith a report on the study we have conducted for you to determine whether, and to what extent, the proposed use of Eagle Mountain Mine, northeast of Desert Center, for non-hazardous landfill will impact cultural resources of concern to Native Americans whose traditional territory lay in this area. Please let us know if there is any further information you need.

We shall be mailing a hard copy of the report as well as a disc copy, WordPerfect 4.2.

This has been an interesting project. We hope we'll be working with RECON again.

Sincerely,
CULTURAL SYSTEMS RESEARCH, INC.

Sylvia Vane

Sylvia Brakke Vane
Vice President

cc.
Mr. Dennis Miller, Chairman, Morongo Tribal Council
Mr. Richard Milanovich, Chairman, Agua Caliente Tribal Council
Mr. John James, Chairman, Twentynine Palms General Council
Mr. Daniel Eddie, Jr., Chairman, Colorado River Tribal Council
Ms. Nora Garcia, Chairperson, Fort Mohave Tribal Council
Mr. Robert Pride, Chairperson, Torres-Martinez Council
Ms. Christine Walker, Chairman, Chemehuevi Tribal Council
Ms. June Mike, Chairman, Twenty-Nine Palms General Council
Mr.Russell Kaldenberg, Bureau of Land Management, Palm Springs

ATTACHMENT NO. 3. Current Ethnology and Native American Concerns, by Cultural Systems Research, Inc.

NATIVE AMERICAN CONCERNS

Cultural Systems Research, Inc. (CSRI) has conducted a study for Regional Environmental Consultants (RECON) to determine whether, and to what extent, the proposed use of the Eagle Mountain Mine, northeast of Desert Center, for non-hazardous landfill will impact cultural resources of concern to Native Americans whose traditional territory lay in this area. This is a report on CSRI's findings.

METHOD

This study began with a consultation on January 10, 1990 between RECON Project Archaeologist McMillan Davis and Lowell John Bean, Ph.D., and Sylvia Brakke Vane, M.A., of CSRI. The project was described by Davis and other RECON staff members, and it was agreed that CSRI would complete a draft report by March 1, 1990.

CSRI's work on the project was conducted by Bean, Vane, and Ethnographer Jackson Young. Bean and Vane planned the research, and decided, on the basis of information gained in previous research, that the vicinity in which the Eagle Mountain mine is located would have been with the traditional territory of the Mojave, Chemehuevi, and Cahuilla Indians, and that therefore the following reservations should be given an opportunity to comment on the proposal to use the mine for landfill, as proposed by the Mine Reclamation Corporation: Fort Mojave Indian Reservation (Mojaves), Chemehuevi Indian Reservation (Chemehuevi), Colorado River Indian Reservation (Mojave and Chemehuevi), Twentynine Palms Indian Reservation (Chemehuevi), Morongo Indian Reservation (Cahuilla, Serrano, and Chemehuevi), Agua Caliente Indian Reservation (Cahuilla), Cabazon Indian Reservation (Cahuilla and Chemehuevi), and Torres-Martinez Indian Reservation (Cahuilla). Letters describing the project, and saying that we would be touch with them to make arrangements to visit the mine area were sent the chairpersons of the governing bodies of each of these reservations on January 17.

Commencing on January 24, Young made phone calls to each reservation. Vane and Young also discussed the project with several Mojave and Cahuilla elders with whom they have recently been working. It was eventually decided that a trip to the vicinity of the mine would be made on Monday, February 19.

It had been determined by February 19 that Morongo Indian Reservation, Agua Caliente Indian Reservation, and Cabazon Indian Reservation did not wish to visit the mine area, nor to make any statement with respect to the project. Fort Mojave Indian Reservation, and Chemehuevi Indian Reservation had expressed interest, but in the event did not join in the visit to the mine nor make a statement.

The participants in the visit to the mine area were Vane and Young from CSRI, a Chemehuevi and two Mojaves from the Colorado River Indian Tribes (CRIT), and a Cahuilla elder from Torres-Martinez Indian Reservation.

In the meantime, a search of the literature had been made by Vane to find evidence of use of the area by Native American groups, and a trip to Joshua Tree

National Monument headquarters was made by Bean and Vane on January 26. The purpose of this trip was to determine whether the collection of artifacts held at the monument included any found in the vicinity of the mine, and to examine any found and their provenience.

This report has been written by Vane and edited by Bean.

RESULTS OF RESEARCH

Territorial Boundaries. One purpose of the research was to determine whether the assumption that modern-day Mojave, Chemehuevi, and Cahuilla represent the descendants of most of the tribal groups that would traditionally have used the vicinity of the Eagle Mountain Mine is a reasonable assumption. Our study showed that the Eagle Mountains were probably used by the Cahuilla in the "ethnographic present," and by the Chemehuevi from the mid-nineteenth century on. They may have been used by the "Desert Mojave," at an earlier time. For as long as the present climatic conditions have existed, these mountains have probably been mainly a place to hunt mountain sheep and deer, an area of temporary, but not permanent, campsites. The Native Americans to whom we talked, using their interlocking fingers to demonstrate, spoke of this being an area where the territories of several groups might overlap, with now one group and then another coming in to hunt. The Chemehuevi spoke of its being primarily "Desert Mojave" territory, whereas the Mojaves assigned it to the Chemehuevi.

The Cahuilla consultant had himself come to hunt for mountain sheep and deer in the Eagle Mountains "fifty years ago" with John Hilton and another non-Indian. He remembers a large cottonwood tree and a stream that flowed mostly underground, coming to the surface only at intervals. He says the mine has changed the landscape so much that he cannot say exactly where this cottonwood tree and the stream would have been.

This consultant remembers an older tradition. There were about fifty wild burros in Borrego Valley. Led by Lupe Lugo, a number of young Cahuillas mounted on horseback chased the burros to Torro, thence to Tuva (now under the Salton Sea), on to Desert Center, and finally up into the Eagle Mountains. He also points out that in traditional times Cahuillas would come from what are now the Cahuilla and Santa Rosa reservations to Torro and then go on to Yuma--hence they must have known the trails and where the springs were.

Lupe Lugo, our consultant said, also drove cattle from the Coachella Valley to Blythe, and would have come through the Eagle Mountains with them.

Bean (1978:75) describes Cahuilla territory as extending as far south as the Chocolate Mountains and as far east as "a part of the Colorado Desert west of Orocopia mountain." Personnel at the Joshua Tree National Monument have been considering the Eagle Mountains as Cahuilla territory, though their collection does not contain artifacts that can be assigned a specific ethnic group. No Cahuilla oral literature pertaining to the Eagle Mountains is known to us.

Mojave traditional territory lies primarily along the Colorado River, where they are known to have lived ever since the Spanish explorer Oñate described finding "Amacavas" in 1604, but present-day Mojave say that the Mojave territory also included the whole of the Mohave Desert, and that they are concerned about anything that impacts that desert. Mojave oral literature (Kroeber 1948, 1951, and 1972), which consists primarily of songs that describe a journey, speaks mainly of the vicinity of the Colorado River, but some songs take the listener into what is now Arizona, as well as into the Mohave Desert in California. The Tehachapi Mountains and places along the Mohave River are mentioned fairly frequently. The only published reference that could possibly include the Eagle Mountain area was "A Mohave Historical Epic" (Kroeber 1951), in which two leaders from the Mohave Valley migrate to the Providence Mountains, thence to a mountain east of San Bernardino which may have been San Gorgonio Peak, and then, after a two day stay, went on to the "Kamia country" on the Colorado River via a place where *Haoikwa* and Quail lived. This place is unidentified, but it is said they lived on two different kinds of grass seeds while there (Kroeber 1951:77). This story, regardless of where this stopping place was, suggests an occasional foray into the Colorado Desert, and possibly the Eagle Mountain area, by the Mojaves.

Although our Chemehuevi consultant said that Chemehuevis and other Southern Paiutes came from as far away as Pahrump to hunt in or travel across the Eagle Mountian area, the main Chemehuevi use of the Eagle Mountain area would have been after several Chemehuevi families moved into the Coachella Valley reservations (into which they married), and especially the Twentynine Palms Reservation, set aside as a reservation after the Mojave-Chemehuevi war in the 1860s. The Eagle Mountains would have been a convenient hunting area for people living in the Twentynine Palms area.

Chemehuevi songs, as mapped by Laird (1976), pertained to an area closer to the Colorado River and not extending into this vicinity.

The Chemehuevi consultant noted a recent association of Chemehuevi with the Eagle Mountain Mine in that a nephew of hers, while living with a foster family, attended the Eagle Mountain High School.

Our consultants fell to talking of the real, as opposed to the fictional, Willie Boy. He was Chemehuevi, from the Wicke family, son of Mary Snyder of Morongo. He escaped via Whitewater and Twentynine Palms to the Parker area and was not killed by the posse that went after him. He took refuge in a cave north of Twentynine Palms and was brought food by a cousin. He had been a good hunter and knew the water holes in these mountains. After his death, his mother walked from Morongo to Parker--she also knew where to find food and water.

Impact of Project. None of the Native American consultants identified the Eagle Mountains as sacred or having special significance to their people. One of the Mojaves, emphasizing that he was speaking out of concern for all citizens and not just Indians, noted that wastes identified as non-hazardous had a way of turning out to be hazardous, and opposed using the site for landfill. All the CRIT consultants were concerned about the possibility of inadvertent dumping of materials that might turn out to be hazardous, their reservation having had such an experience itself. CRIT had contracted to let a firm dump several hundred truckloads of ground-up materials from automobile interiors on the reservation. The materials were allowed to aerate on the surface for a time, and were then covered with dirt. Unfortunately, chemical reactions occurring after several months brought about an explosion, and the landfill operation had to brought to an end. The materials had contained many PCBs.

CRIT consultants also pointed out that many eastern cities had run into trouble after wastes not known to be hazardous were used as landfill. They said they'd want assurances that such things would not happen.

The Chemehuevi consultant opposed using the site for landfill, observing that when the wind blows, materials from landfill sites blow into the air and affect its quality. She then added that such objections would apply anywhere, and this "would be as good a place as any."

The other Mojave asked what the effect of using the site for landfill would have on the desert tortoise population. He wanted to know the results of any studies of the impact on tortoises and other wild life. He referred to the fact that landfill sites attract and increase the population of ravens, who attack young tortoises, thereby increasing the stress on this endangered species.

The Cahuilla consultant said that he would not live to see any harm that might come from using the Eagle Mountain mine as a landfill site, and expressed the opinion that it was up to younger people to think about such impacts. Cahuilla reservation tribal councils we contacted did not express concern.

RECOMMENDATION. No mitigable impact on Native American values was demonstrated by this study, but CRIT consultants were concerned about the effect of using the Eagle Mountain mine as a landfill site might have on air quality, plants, and animals. The results of any studies of such impacts should be sent to CRIT. It would be advisable to send them to all the tribal groups consulted in this study.

REFERENCES

Bean, Lowell John

1978 Cahuilla. In Handbook of North American Indians, Vol. 8 (California). William C. Sturtevant, gen ed., Robert F. Heizer, vol. ed. Pp. 575-587. Washington: Smithsonian Museum.

Kroeber, Alfred L.

1948 Seven Mohave Myths. Anthropological Records 11:1. Berkeley: University of California Press.

Kroeber, Alfred L.

1951 A Mohave Historical Epic. Anthropological Records 11(2). Berkeley: University of California Press.

Kroeber, Alfred L.

1972 More Mohave Myths. Anthropological Records 27. Berkeley: University of California Press.

Laird, Carobeth

1976 The Chemehuevis. Morongo Indian Reservation, Banning California: Malki Museum Press.

ATTACHMENT 4

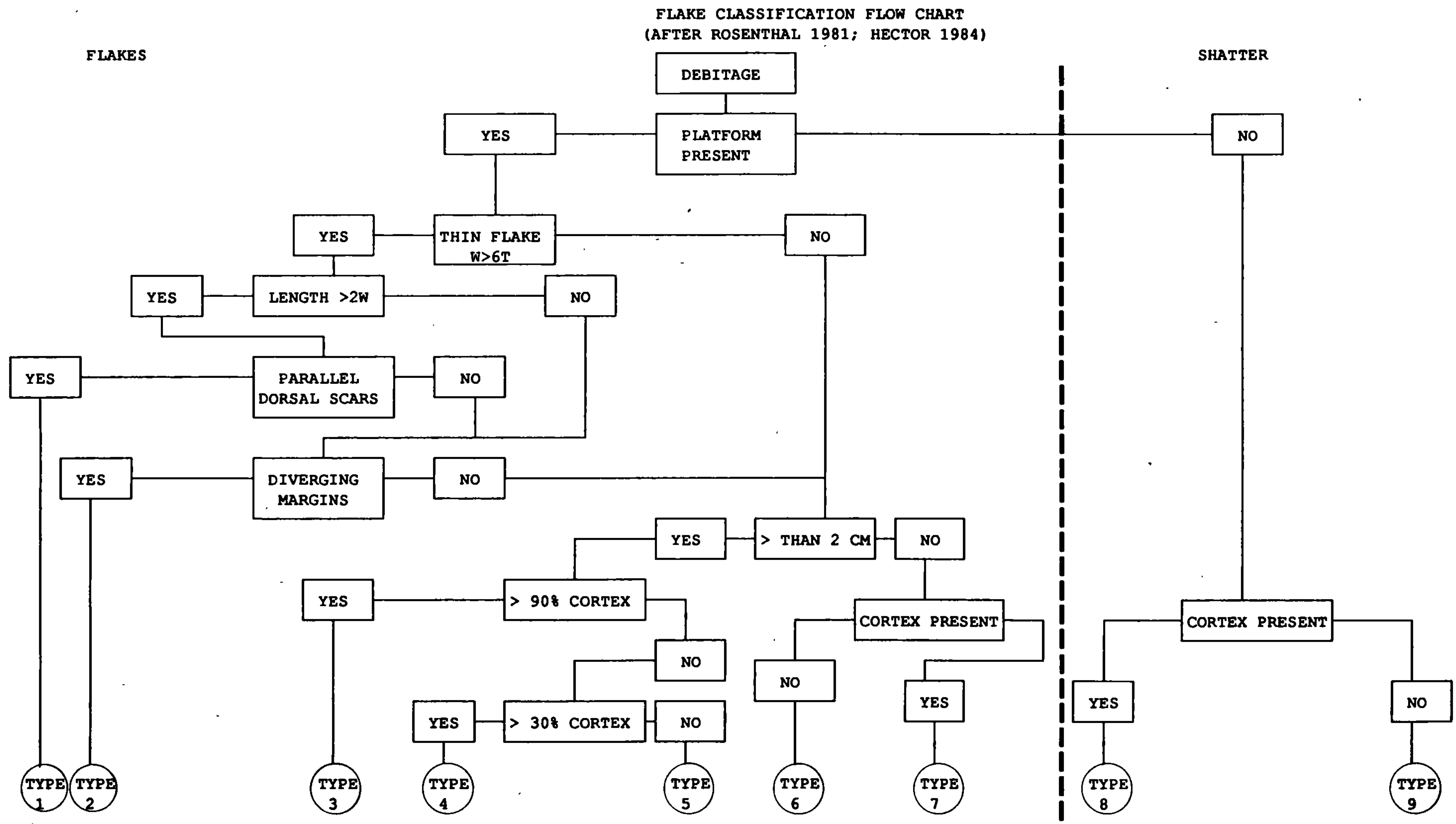
KEY TO FLAKES AND SHATTER

Item	Description	
accession number	RECON: R000 WESTEC: W000	
catalog number		
site number	00000 for SDi-#s W0000 for SDM-W-#s	
locus		
unit		
category	2. debitage	
feature	1. hearth 2. burial	
level	10, 20, 30, . . .	
material	1. coarse grained metavolcanic 2. coarse grained porphyritic metavolcanic 3. fine grained metavolcanic 4. fine grained porphyritic metavolcanic	5. quartzite 6. quartz 7. chert/chalcedony 8. obsidian 9. other
flake types	counts of each type within the material type specified; see attached flow diagram	

FLAKE TYPOLOGY

Type	Bulb	Platform	Relative Length	Cortex	Dorsal Scars	Other	Assumed Process
1	Present	Present	2x w	--	2+	Parallel sides	Specialized blade type
2	Present	Present	--	--	--	Diverging, thin	Bifacial thinning
3	Present	Present	2+ cm	80%	0	--	Platform creation, cortex removal
4	Present	Present	2+ cm	30-80%	0-1	--	Cortex removal
5	Present	Present	2+ cm	-30%	1+	--	Core reduction, basic shaping
6	Present	Present	-2 cm	0%	1+	--	Finishing, resharpening
7	Present	Present	-2 cm	Present	1+	--	Trimming
8	Absent	Absent	--	Present	--	--	Shatter during primary reduction
9	Absent	Absent	--	Absent	--	--	Shatter during secondary reduction

Source: After Norwood, Bull, and Rosenthal 1981.



FLAKE CLASSIFICATION FLOW CHART (AFTER ROSENTHAL, 1981 AND HECTOR, 1984)

02/06/91

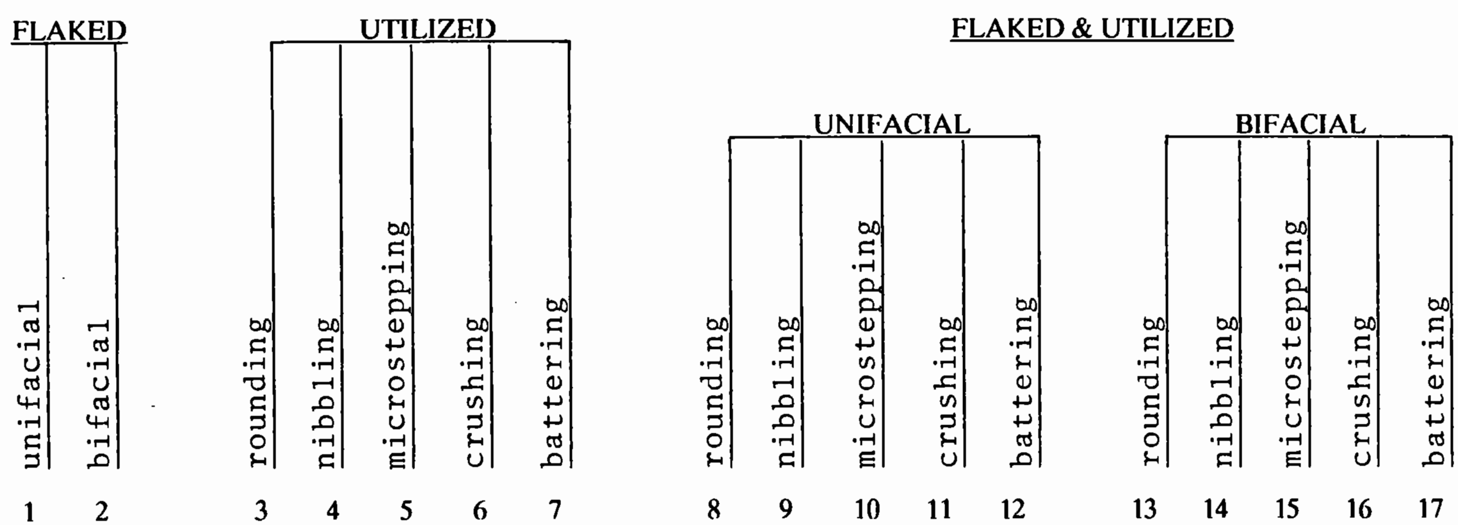
DEBITAGE - RAW LISTING

ACC	CAT	SITE	LOC	UNIT	FEA	LEV	FLD#	NA	TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9
** SITE EMRR1																	
R210	3	EMRR1	2			0		7	0	0	0	0	0	0	0	1	0
R210	8	EMRR1	6			0		1	0	0	0	0	1	0	0	0	0
R210	9	EMRR1	7			0		9	0	0	0	0	1	0	0	0	0
R210	10	EMRR1	8			0		7	0	0	0	0	0	0	0	1	0
R210	12	EMRR1	10			0		6	0	0	0	0	1	0	0	0	0
R210	16	EMRR1	12			0		7	0	0	0	1	0	0	0	0	0
R210	22	EMRR1	16			0		5	0	0	0	0	1	0	0	0	0
R210	48	EMRR1	40			0		7	0	0	0	0	0	0	0	0	1
R210	54	EMRR1	46			0		7	0	0	0	0	1	0	0	0	0
R210	54	EMRR1	46			0		7	0	0	0	0	1	0	0	0	0
** Subtotal **																	
									0	0	0	1	6	0	0	2	1

KEY TO FLAKED LITHIC ARTIFACTS

Item	Description	
catalog number		
locus		
unit		
feature	1. hearth 2. burial	
level	10, 20, 30, . . .	
weight	to the nearest gram	
length	in millimeters	
width	in millimeters	
thickness	in millimeters	
material	1. coarse grained metavolcanic 2. coarse grained porphyritic metavolcanic 3. fine grained metavolcanic 4. fine grained porphyritic metavolcanic	5. quartzite 6. quartz 7. chert/chalcedony 8. obsidian 9. other
label	1. core 2. blades 3. projectile points 4. knives 5. scrappers-unifacial 6. choppers	7. hammers 8. utilized flakes 9. modified flakes 10. crescentii 11. drills 12. blanks
production base	1. flake 2. core	3. cobble 4. other
condition	1. whole	2. broken
patination	1. present	0. absent
cortex	1. present	0. absent
type	1-14 see chart	
circumference	1. 0-90 2. 0-180	3. 0.270 4. 0-360
angle	1. 0-30 2. 30-60	3. 60-90 4. 90+

IDENTIFICATION OF
NON-CONTIGUOUS, EXCLUSIVE DAMAGE EVENTS (NEDEs)



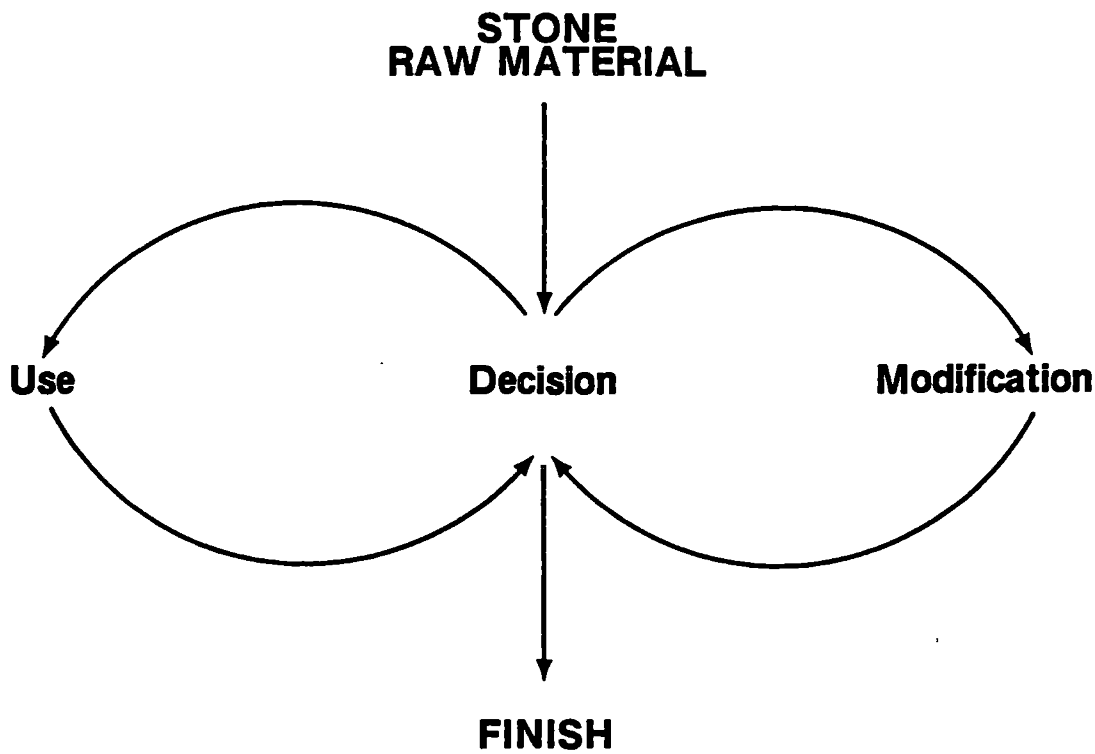
NOTE: NEDEs--
are continuous along a line not broken by an angle less than 90 degrees or undamaged area (noncontiguous)

are continuous breakage of the same type (exclusive)

can be interrupted by recent breakage and still be interpreted as continuous

does not include platform preparation

Circumference--A circle defined by diameter equaling the maximum length of artifact



NEDES TASK EVENT PROCESS

02/06/91

RAW LISTING FOR FLAKED LITHIC ARTIFACTS - DESCRIPTIVE

ACC	CAT	SITE	LOCUS	UNIT	FEA	LEV	FND	M	C	LB	WT	LN	WD	TH	P	PD	CR	NN
** SITE EMRR1																		
R210	13	EMRR1	10			0		7	1	5	10	24	36	16	2	0	1	4
R210	19	EMRR1	14			0		7	1	5	9	22	21	21	4	0	1	1
R210	32	EMRR1	26			0		7	1	5	21	32	43	14	4	1	0	2
R210	39	EMRR1	32			0		6	1	3	4	34	18	6	4	0	0	3
R210	44	EMRR1	37			0		3	1	3	11	54	26	8	4	0	0	5
R210	53	EMRR1	45			0		7	1	5	6	25	23	8	2	1	0	3
R210	53	EMRR1	45			0		7	1	5	6	25	23	8	2	1	0	3
** Subtotal **																		
											67	216	190	81				

02/06/91

RAW LISTING FOR FLAKED LITHIC ARTIFACTS - ATRIBUTES

ACC	CAT	SITE	LOCUS	UNIT	FEA	LEV	FND	M	C	LB	T1	C1	A1	T2	C2	A2	T3	C3	A3	T4	C4	A4	NN
** SITE EMRR1																							
R210	13	EMRR1	10			0		7	1	5	4	1	3	9	1	3	9	1	3	9	1	3	4
R210	19	EMRR1	14			0		7	1	5	10	1	3	0	0	0	0	0	0	0	0	0	1
R210	32	EMRR1	26			0		7	1	5	9	1	3	4	1	3	0	0	0	0	0	0	2
R210	39	EMRR1	32			0		6	1	3	1	2	3	1	2	3	2	1	3	0	0	0	3
R210	44	EMRR1	37			0		7	1	3	2	2	1	2	2	1	2	1	2	2	1	2	5
R210	53	EMRR1	45			0		7	1	5	9	2	2	5	1	3	4	1	3	0	0	0	3
R210	53	EMRR1	45			0		7	1	5	9	2	2	5	1	3	4	1	3	0	0	0	3

KEY TO GROUND STONE

Item	Description	
accession number	RECON: R000	WESTEC: W000
catalog number		
site number	00000 for SDi-#s W0000 for SDM-W-#s	
locus		
unit		
category	5. ground stone	
feature	1. hearth 2. burial	
level	10, 20, 30, . . .	
material	1. granite 2. quartzite 3. andesite	4. sandstone 5. other
weight	to the nearest gram	
length	in millimeters	
width	in millimeters	
thickness	in millimeters	
condition	1. whole	2. broken
type	1. mano 2. pestle 3. slab	4. basin 5. bowl 6. other
shaped	1. unshaped	2. broken
	(shaped manos/pestles are shouldered, bifacial, and have edge treatment to produce a tabular profile)	
number of faces	1 face 2 faces	3 faces 4 faces
battering	1. end 2. side	3. both
side 1 (ground surface of metate): length/width/depth	in millimeters	
side 2 (ground surface of metate): length/width/depth	in millimeters	

02/06/91

RAW LISTING FOR GROUNDSTONE

ACC	CAT	SITE	LOC	UNIT	LEV	FDN	MT	WGT	LN	WD	TH	C	T	SH	F	B	L1	W1	D1	L2	W2	D2
** SITE EMRR1																						
R210	49	EMRR1	41		0		1	1359	158	101	60	1	1	1	1	0	0	0	0	0	0	0
R210	56	EMRR1	48		0		5	1287	214	141	33	2	3	1	1	0	170	97	5	0	0	0
R210		EMRR1			0		1	1359	158	101	60	1	1	1	1	0	0	0	0	0	0	0
	49		41																			
R210		EMRR1			0		5	1287	214	141	33	2	3	1	1	0	170	95	5	0	0	0
	56		48																			
** Subtotal **																						
								5292									340	192	10	0	0	0
*** Total ***																						
								5292									340	192	10	0	0	0

KEY TO POTTERY ATTRIBUTES DATA LISTING

ACC:	ACCESSION #	
CAT#:	CATALOG NUMBER	
SITE#:	SITE NUMBER	
WGHT:	WEIGHT	
		to the nearest tenth gram
TYP:	POTTERY TYPE	
		SB = Salton Buff
		CB = Colorado Beige
RM:	RIM	
		Y = Yes
		N = No
MUNS-INT:	MUNSELL COLOR-INTERIOR	
MUNS-EXT:	MUNSELL COLOR-EXTERIOR	
TH:	THICKNESS	

02/06/91

Riv-3798 pottery

ACC	CAT#	SITE#	TYP	WGHT	RM	MUNS-INT	MUNS-EXT	TH
R210	1	R3798	SB	2.8	Y	5 Y8/2	5 Y7/3	4
R210	2	R3798	SB	8.7	Y	7.5YR7/4	7.5YR5/4	5
R210	14	R3798	SB	21.5	N	10 YR7/2	10 YR7/[illegible]	5
R210	15	R3798	SB	12.8	Y	7.5YR6/4	7.5YR7/4	7
R210	17	R3798	CB	17.5	N	2.5 Y6/2	2.5 Y5/2	4
R210	20	R3798	SB	11.6	N	10 YR5/1	10 YR6/2	3
R210	23	R3798	SB	8.0	N	5 YR4/1	10 YR7/3	4
R210	33	R3798	SB	7.7	N	7.5YR6/4	7.5YR8/2	3
R210	45	R3798	SB	9.4	Y	10 YR6/3	10 YR6/1	6
R210	46	R3798	SB	5.1	N	7.5YRN4/	10 YR7/1	5
R210	47	R3798	CB	10.5	Y	10 YR7/3	10 YR7/2	4
R210	4A	R3798	SB	17.7	N	7.5YR8/2	5 YR6/6	4
R210	4B	R3798	CB	43.5	N	10 YR6/2	2.5YRN5/	7
R210	50	R3798	SB	3.5	N	10 YR7/2	7.5YRN4/	3
R210	51	R3798	SB	2.9	N	7.5YR6/4	10 YR7/3	5
R210	52	R3798	SB	9.2	N	7.5YR6/2	10 YR7/1	5
R210	55	R3798	SB	9.1	N	2.5YR6/6	2.5YRN6/	3
R210	5A	R3798	CB	11.8	Y	7.5YR7/2	7.5YR8/2	6
R210	5B	R3798	CB	10.0	Y	7.5YR8/2	7.5YR7/4	7
R210	6A	R3798	SB	12.4	Y	10 YR7/2	2.5 Y7/2	5
R210	6B	R3798	CB	49.5	N	7.5YR6/4	7.5YR7/2	7
R210	6C	R3798	SB	10.7	N	10 YR7/1	10 YR7/3	3
R210	6D	R3798	SB	4.2	N	7.5YR7/2	10 YR5/1	5
R210	7A	R3798	SB	6.4	N	10 YR7/2	10 YR5/2	4
R210	7B	R3798	SB	6.5	N	10 YR6/2	10 YR7/1	4
R210	7C	R3798	SB	3.1	N	10 YR7/2	2.5 Y6/2	4
R210	7D	R3798	SB	2.6	N	10 YR7/3	10 YR6/1	4
R210	11A	R3798	SB	1.0	N	10 YR6/2	2.5 Y7/2	2
R210	11B	R3798	SB	1.5	N	2.5 Y7/2	2.5 Y7/2	2
R210	11C	R3798	SB	14.8	N	5 YR6/2	5 YR7/4	6
R210	11D	R3798	SB	8.8	N	7.5YR7/2	7.5YR5/2	5
R210	11E	R3798	SB	6.5	N	5 YR6/3	5 YR5/3	4
R210	18A	R3798	CB	18.0	Y	7.5YR7/2	5 YR6/6	7
R210	18B	R3798	SB	3.1	N	5 YR6/1	5 YR6/6	4
R210	18C	R3798	SB	2.7	N	7.5YRN5/	5 YR6/3	4
R210	18D	R3798	SB	1.6	N	7.5YR6/2	7.5YR6/2	3
R210	18E	R3798	SB	4.3	N	7.5YR7/4	10 YR7/2	4
R210	21A	R3798	SB	10.2	Y	10 YR7/3	10 YR6/2	5
R210	21B	R3798	SB	18.3	N	10 YR6/2	10 YR6/2	4
R210	21C	R3798	SB	19.3	N	10 YR5/1	7.5YR7/4	3
R210	21D	R3798	SB	8.4	N	10 YR7/3	10 YR5/1	4
R210	21E	R3798	SB	19.5	N	2.5 Y8/2	10 YR7/3	8
R210	21F	R3798	SB	5.1	N	10 YR6/2	10 YR5/1	4
R210	21G	R3798	SB	2.0	N	7.5YR7/4	10 YR7/3	3
R210	24A	R3798	SB	16.3	Y	2.5 Y6/2	2.5 Y7/2	6
R210	24B	R3798	SB	15.9	N	10 YR7/2	10 YR5/1	5
R210	24C	R3798	SB	2.8	N	10 YR6/2	10 YR6/2	3
R210	24D	R3798	SB	5.7	N	10 YR7/2	10 YR5/2	5
R210	24E	R3798	SB	8.0	N	2.5 Y6/2	2.5 Y5/2	5
R210	24F	R3798	SB	3.7	N	2.5 Y7/2	2.5 Y5/2	4
R210	24G	R3798	SB	3.8	N	2.5 Y6/2	2.5 Y5/2	3

Riv-3798 pottery

ACC	CAT#	SITE#	TYP	WGHT	RM	MUNS-INT	MUNS-EXT	TH
R210	24H	R3798	SB	5.8	N	7.5YR7/4	10 YR7/4	5
R210	24I	R3798	SB	2.2	N	10 YR7/3	2.5 Y7/2	4
R210	25A	R3798	SB	7.3	Y	2.5 YN3/	2.5 YN4/	4
R210	25B	R3798	SB	1.9	N	10 YR6/3	5 YR6/4	2
R210	26A	R3798	SB	2.6	N	5 YR7/4	5 YR5/1	3
R210	26B	R3798	SB	3.5	N	10 YR7/2	5 YR4/3	3
R210	26C	R3798	SB	3.6	Y	10 YR7/1	5 YR4/2	3
R210	26D	R3798	SB	3.8	N	7.5YR6/2	10 YR6/2	4
R210	26E	R3798	SB	3.8	N	5 YR7/4	7.5YR6/2	2
R210	27A	R3798	SB	26.3	N	7.5YRN4/	7.5YRN5/	5
R210	27B	R3798	SB	10.6	N	10 YR6/2	10 YR5/1	4
R210	27C	R3798	SB	9.1	N	10 YR7/2	10 YR6/2	3
R210	27D	R3798	SB	19.0	N	7.5YR6/2	7.5YR6/2	4
R210	28A	R3798	SB	7.1	Y	5 YR7/4	5 YR7/4	5
R210	28B	R3798	SB	2.7	N	10 YR6/2	10 YR7/2	3
R210	29A	R3798	SB	3.8	N	10 YR6/2	2.5 Y6/2	3
R210	29B	R3798	SB	6.7	N	2.5 Y6/2	2.5 Y5/2	3
R210	29C	R3798	SB	4.1	N	2.5 Y6/2	2.5 Y5/2	3
R210	29D	R3798	SB	1.6	N	2.5 Y6/2	10 YR5/2	3
R210	29E	R3798	SB	2.0	N	2.5 Y6/2	10 YR5/2	3
R210	29F	R3798	SB	3.6	N	10 YR6/2	10 YR5/1	5
R210	29G	R3798	SB	1.9	N	10 YR6/2	10 YR6/2	3
R210	29H	R3798	SB	1.7	N	2.5 Y6/2	10 YR6/3	3
R210	29I	R3798	SB	2.0	N	2.5 Y6/2	2.5 Y5/2	3
R210	29J	R3798	SB	3.9	N	10 YR6/2	10 YR5/1	4
R210	30A	R3798	SB	9.6	Y	10 YR7/2	10 YR5/1	7
R210	30B	R3798	SB	5.1	N	10 YR7/1	10 YR5/1	5
R210	31A	R3798	SB	3.3	N	7.5YR6/2	7.5YRN5/	4
R210	31B	R3798	SB	3.4	N	7.5YRN5/	10 YR7/2	3
R210	31C	R3798	SB	1.6	N	5 YR5/4	10 YR6/2	4
R210	34A	R3798	SB	9.1	Y	10 YR7/2	10 YR7/2	5
R210	34B	R3798	SB	7.0	N	10 YR7/3	10 YR5/1	4
R210	35A	R3798	SB	3.7	Y	10 YR7/3	10 YR7/3	4
R210	35B	R3798	SB	18.3	N	10 YR5/1	10 YR6/2	4
R210	36A	R3798	SB	6.1	N	2.5 YN5/	10 YR6/1	2
R210	36B	R3798	SB	6.1	N	10 YR7/2	2.5 YN5/	4
R210	37A	R3798	SB	27.2	Y	10 YR7/1	7.5YR7/4	6
R210	37B	R3798	CB	10.7	N	10 YR6/1	10 YR6/3	5
R210	37C	R3798	SB	21.9	N	10 YR5/1	10 YR8/3	9
R210	37D	R3798	SB	7.9	N	10 YR7/2	10 YR5/1	3
R210	38A	R3798	SB	19.6	N	10 YR6/3	10 YR7/3	5
R210	38B	R3798	SB	2.2	N	7.5YR7/4	7.5YR6/4	5
R210	38C	R3798	SB	6.1	N	10 YR5/2	10 YR5/1	5
R210	40A	R3798	SB	9.7	Y	10 YR6/1	7.5YR6/4	7
R210	40B	R3798	SB	10.1	N	7.5YRN4/	10 YR7/1	6
R210	41A	R3798	SB	13.7	N	7.5YR6/4	10 YR8/3	3
R210	41B	R3798	SB	14.5	N	2.5YR6/4	7.5YR7/2	4
R210	41C	R3798	SB	8.4	N	7.5YR7/2	10 YR7/1	4
R210	42A	R3798	SB	24.3	N	10 YR6/1	10 YR5/1	3
R210	42B	R3798	SB	2.2	N	10 YR6/1	10 YR5/1	3
R210	42C	R3798	SB	5.7	N	10 YR6/1	10 YR5/1	3

PAGE NO. 3
02/06/91

Riv-379B pottery

ACC	CAT#	SITE#	TYP	WGHT	RM	MUNS-INT	MUNS-EXT	TH
R210	43A	R379B	SB	6.9	N	10 YR7/1	10 YR6/1	4
R210	43B	R379B	SB	7.3	N	10 YR6/2	10 YR5/1	4
R210	43C	R379B	SB	5.3	N	10 YR5/1	10 YR7/3	3
R210	A/1	R379B	SB	14.4	N	2.5YR5/6	10 YR6/6	6
*** Total ***								
				952.0				

APPENDIX J

PALEONTOLOGIC RESOURCE ASSESSMENT

EAGLE MOUNTAIN MINE SOLID WASTE DISPOSAL SITE

Robert E. Reynolds
Curator of Earth Sciences

San Bernardino County Museum
2024 Orange Tree Lane
Redlands, California 92374

for

RECON
1276 Morena Boulevard, San Diego CA 92110-3815

December, 1989

Paleontologic Resource Assessment
Eagle Mountain Mine (MRC)

INTRODUCTION

Mine Reclamation Corporation (MRC) proposes to utilize a portion of the Eagle Mountain open pit mine as a regional solid waste disposal site. The usage in part includes retrieving recyclable materials. The proposal includes utilization of a portion of the Eagle Mountain mine as a land fill as well as access by road and access by the Kaiser Railroad. These are discussed herein as follows:

1a. Mine/landfill site, 1,650 acres

1b. Kaiser Road, 5 mile access

1c. Kaiser Railroad north of Interstate 10, approximately 12 miles, and

2. Kaiser Railroad south of Interstate 10, approximately 40 miles.

This paleontologic resource assessment includes a review of pertinent geologic literature and a check of paleontologic resource locality records in the Regional Paleontologic Locality Inventory at the San Bernardino County Museum. Based on this review, a preconstruction field survey of sensitive portions of the mine site, access roads, and railroad right of way was conducted to provide information on which a detailed plan for mitigation could be developed.

The area under assessment consists of two distinct geologic and geographic areas: the area north of Interstate 10 and the area south of Interstate 10. This report is divided into sections reflecting these distinct areas.

METHODS

The review of geologic literature was conducted in the library of the Earth Sciences Division at the San Bernardino County Museum, in the University of California, Riverside Department of Earth Sciences library, and in the personal reference collections of the author. The review of resource localities was conducted at the Regional Paleontologic Locality Inventory of the San Bernardino County Museum, the site files of the University of California, Riverside, and paleontologic site records from the Natural History Museum of Los Angeles County (LACM), Section of Vertebrate Paleontology.

The field survey was directed by Robert E. Reynolds, Curator of Earth Sciences, San Bernardino County Museum. Mr. Reynolds has had more than 25 years of field experience in paleontologic survey, assessment, and salvage in southern and central California, including San Bernardino, Riverside, and Imperial counties. He was assisted by Quintin Lake, James Steinmetz, James Bowden, Allen Tedrow, and Kathleen Springer, all employees of the Earth Sciences Division of the San Bernardino County Museum and each with experience in paleontologic resource assessment in Riverside and San Bernardino counties. The survey was conducted between November 30 and December 8, 1989. Field work was conducted under Bureau of Land Management paleontologic permit CA881416 with a Fieldwork Authorization Permit issued by the Bureau of Land Management, Indio Resource Area, Russell Kaldenberg, Area Manager.

Field work was conducted by teams who traversed portions of the parcels on foot at 30 meter intervals with intuitive deviations to inspect likely looking outcrops of sediments at the Eagle Mountain mine and along rights of way to the mine, which include the Eagle Mountain Road and the Kaiser Railroad. Teams of two persons paralleled the right of way center line, inspecting outcrops in washes and sediments exposed in railroad cuts and in access road cuts.

NORTH OF INTERSTATE 10

Location

The Eagle Mountain mine site, including the proposed land fill location, the Kaiser access road, and approximately 12 miles of the Kaiser Railroad are located north of Interstate 10 between Indio and Blythe. This portion is treated in one section because of similarities of geologic units.

1a. Mine/Disposal Site is located in portions of:

sections 25, 26, 27, 28, 33, 34, 35, 36, T.3S, R.14E;

section 31, T.3S, R.15E;

section 6, T.4S, R.15E; and

sections 1, 2, 12, T.4S, R.14E,

as shown on the Pinto Wells 7.5', Coxcomb Mountains 7.5', Victory Pass 7.5', and Buzzard Spring 7.5' quadrangle maps.

1b. Eagle Mountain Road is the proposed truck access, running north from Interstate 10. The north portion of this road may be relocated parallel to a proposed spur of the Kaiser Railroad. From the north, the access road crosses portions of:

sections 6, 7, 17, 18, 19, 20, 30, 31, T.4S, R.15E;

sections 6, 7, 18, 19, 30, T.5S, R.15E, SBBM

as shown on the Victory Pass 7.5' and Desert Center 7.5' quadrangle maps.

1c. Kaiser Railroad north of Interstate 10 runs to the Eagle Mountain mine. For clarity, the portion of the railroad north of Interstate 10 is discussed here; discussion of the portion of the railroad south of Interstate 10 follows. Kaiser Railroad north of Interstate 10 crosses the following sections:

sections 1, 2, 11, T.4S, R.14E SBBM;

sections 6, 7, 17, 18, 19, 20, 30, 31, T.4S, R.15E;

sections 12, 13, 23, 24, 26, 27, 28, 29, 31, 32, T.5S, R.14E; and

section 6, T.6S, R.14E, SBBM

as shown on the Victory Pass 7.5', Desert Center 7.5', and

Hayfield Spring 7.5' quadrangles.

Impacts

Impacts to sediments containing nonrenewable paleontologic resources may occur through project development and use.

1a. Mine/Landfill site. Proposed areas for fill, new structures, and laydown and staging areas would be developed by grading and excavation which could produce impacts to nonrenewable paleontologic resources in sedimentary rocks.

1b. Eagle Mountain Road. Upgrading, realignment, and development of drainage structures would involve excavation. Annual maintenance with excavation equipment might impact nonrenewable paleontologic resources in sedimentary rock units.

1c. Kaiser Railroad North. The rebuilding of the railroad grade, the addition of the proposed spur, development of new drainage structures and access roads, and annual maintenance would all be done with excavation equipment. Excavation into sediments could produce impacts to nonrenewable paleontologic resources.

Resources

The project includes the proposed disposal site at the Eagle Mountain mine, the truck access by Eagle Mountain Road, and approximately 12 miles of Kaiser Railroad lie north of Interstate 10 as it runs east/west between Chiriaco Summit and Desert Center. Rock units in this area are similar, and are discussed separately from rocks south of Interstate 10.

Geologic mapping summarized by C.W. Jennings (1967) indicates that the following rock types occur at the site and along the rights of way.

Gneissic rocks are of high metamorphic grade and have been subject to severe deformation. These rocks may range in age from Proterozoic to early Mesozoic. However, recrystallization involved in their formation precludes preservation of fossils.

Granitic rocks are late Mesozoic in age and because of their intrusive nature are in part responsible for the deformation of the metamorphic rocks listed above. Their mode of emplacement and crystallization precludes preservation of fossils.

Volcanic rocks north of Interstate 10 may be early to middle Miocene in age, circa 20 million years (m.y.), assuming that they are from the same volcanic event that took place in the Orocopia Mountains. The volcanic rock are not associated with sediments or volcaniclastic debris flows and consequently they have a low potential to contain vertebrate fossils. The proposed rights of way will not cross the Tertiary volcanic rocks.

Pleistocene alluvium occurs as dissected fanglomerates and terraces within the project area. These are expected to contain coarse, angular rocks near their source and grade into finer sediments away from their source. The potential for vertebrate fossils in these sediments would increase away from source as sediment clast size became finer and as sediments became stable and developed soil horizons.

Recent alluvium is located in valleys and in wash bottoms between outcrops of the above rock types. These recent, active sediments have low potential to produce paleontologic resources.

Review of the Regional Paleontologic Locality Inventory at the San Bernardino County Museum, and the paleontologic locality records at U.C. Riverside and from the Los Angeles County Museum of Natural History do not indicate that previous paleontologic assessments have been conducted at or near the Eagle Mountain mine site or along the road and railroad rights of way north of Interstate 10. Consequently, no paleontologic resource sites are known from the two sedimentary units encountered by the proposed project.

Results of Field Survey

Field survey was conducted along the road and railroad rights of way north of Interstate 10 and on portions of the Eagle Mountain Mine/proposed landfill site which contained Pleistocene alluvial sediments. Pleistocene alluvium at the eastern portion of the land fill site is very coarse and has a low potential to contain nonrenewable paleontologic resources. No impacts to paleontologic resources are expected during construction excavation related to the development of the proposed land fill or its operation at the Eagle Mountain mine.

The Kaiser Railroad north of Interstate 10 crosses and cuts through coarse Pleistocene fanglomerate. The high-energy method of emplacement of this coarse fanglomerate is not conducive to the preservation of paleontologic resources and the potential for their occurrence is low. No impacts from railroad grade construction of annual maintenance are expected.

Eagle Mountain Road runs north from Interstate 10 and crosses Recent alluvium and older Pleistocene alluvium. The Pleistocene alluvium crossed by Eagle Mountain Road is coarse, indicating high-energy deposition which is generally not conducive to the preservation of vertebrate fossils. Excavation related to road widening and annual maintenance in not expected to produce impacts to paleontologic resources along Eagle Mountain Road north of the Cal Trans right of way associated with Interstate 10.

However, within the Cal Trans right of way at the junction of Eagle Mountain Road and Interstate 10, and to the south of Interstate 10, are sediments conductive to the preservation of vertebrate fossils. These are moderately coarse to fine grained Pleistocene alluvial sediments which contain several horizons of loamy calichified soil with occasional calichified burrows and root casts. These deposits indicate stable alluvium that was receiving fine-grained sediments and which developed soil profiles, including calichification. The sediments are located on both sides of Eagle Mountain Road and within the fenced Cal Trans right of way, and include the access ramps to Interstate 10. Sediments extend southerly out of the Cal Trans right of way. If road construction and realignment is considered for this portion of Eagle Mountain Road near Interstate 10, a program to mitigate impacts to nonrenewable paleontologic resources should be developed for specific excavation plans.

SOUTH OF INTERSTATE 10

Location

2. Kaiser Railroad South of Interstate 10 runs from the Chuckawalla Valley across the Chuckawalla Bench to Chuckawalla Summit. It then parallels Salt Creek as it runs south of the Orocopia Mountains and north of the Chocolate Mountains. The Coachella branch of the All American Canal is near the elevation of the high shoreline of ancient Lake Cahuilla. Near this point, the Kaiser Railroad is north of Salt Creek and runs southwesterly to its terminus at Ferrum, on Highway 111 on the east side of the Salton Sea. The Kaiser Railroad crosses the following sections south of Interstate 10 to Ferrum on Highway 111.

sections 6, 7, 8, 9, 16, 17, 21, 28, 33, T.6S, R.14E;

sections 5, 7, 8, T.7S, R.14E;

sections 12, 13, 14, 21, 22, 23, 28, 29, 31, 32, T.7S, R.13E;

sections 34, 35, 36, T.7S, R.12E;

sections 3, 7, 8, 9, 10, T.8S, R.12E; and

sections 12, 13, 14, 20, 21, 22, 23, 27, 28, 29, T.8S, R.11E

as shown on the Hayfield Spring 7.5', East of Red Canyon 7.5', Red Canyon 7.5', Frink NW 7.5', and Durmid 7.5' quadrangles.

Impacts

2. Kaiser Railroad South. The rebuilding of the railroad right of way and grade, the development of new drainage structures and access roads, and annual maintenance would all be done with excavation equipment. Excavation for cuts within rights of way or excavation for fill outside of the reviewed rights of way could produce impacts to nonrenewable paleontologic resources in sensitive sedimentary deposits.

Resources

Lithologic units south of Interstate 10 are discussed below.

Gneissic rocks of high metamorphic grade in the eastern Orocopia Mountains, western Chuckawalla Mountains, and western Chocolate Mountains are referred to as "Precambrian" age by Jennings (1967) and may be older than 500 million years. The high grade of crystallization and severe deformation precludes preservation of fossils.

Orocopia Schist in the south and western Orocopia Mountains is now considered to be Mesozoic in age (Crowell and Walker, 1962). The Orocopia Schist figures prominently in discussions of amount of offset along the San Andreas Fault. The high degree of crystallization and deformation precludes preservation of fossils.

Granitic rocks span a period of time that includes the late Mesozoic. Their mode of emplacement and crystallization precludes preservation of vertebrate fossils.

The Maniobra Formation of Eocene age (Crowell, 1962; Crowell and Susuki, 1959)contains an important assemblage of invertebrate fossils which includes four gastropods and two pelecypods. The Maniobra Formation plays an important part in discussions of offset along the San Andreas Fault. The Maniobra Formation has the potential to contain vertebrate fossils. The Kaiser Railroad right of way and access roads will not come into contact with the Maniobra Formation.

The Diligencia Formation is now considered to include the Late Arikareean land mammal age of the early Miocene (Woodburne and Whistler, 1973). The following localities have produced vertebrate fossils:

LACM V7114	Merychyus calaminthus	oreodont
UCRV 7901	Stenomylus sp.	small camel

The vertebrate fossils provide age control for the continental sediments of the Diligencia Formation which figures prominently in the discussions of offset distances and rates along the San Andreas Fault. The fossil localities are approximately 2/3 mile distant from the Kaiser Railroad right of way and the formation itself is not encountered by the railroad right of way.

Tertiary volcanics interfinger the early Miocene Diligencia Formation and are mapped as being in the Upper Diligencia or overlying the Diligencia Formation within the Orocopia Mountains. To the southeast, in the Chocolate Mountains, Tertiary volcanics are mapped as sitting within or on top of Pliocene or Pleistocene fluviatile sediments on the northeast side of the San Andreas Fault. The volcanic rocks may provide datable horizons within the sedimentary units between early Miocene and late Pliocene times. These volcanic units south of Interstate 10 are generally associated with sedimentary units which have potential to contain vertebrate fossils. The Kaiser Railroad will not directly cross Tertiary volcanic rocks but is cut into sedimentary units which may interfinger with these volcanic sediments.

Pleistocene old alluvium. Fluviatile sediments include coarse fanglomerates and fine-grained fluviatile sediments which occur along the Kaiser Railroad right of way. These fluviatile sediments are coarse near their source and grade to finer sediments with soil horizons near the valley centers. In the northern Chocolate Mountains and in the western Chuckawalla Mountains, geologic mapping has distinguished older Pleistocene alluvial deposits from Pleistocene alluvium. Field relationships suggest that the latter is younger than the former. The field assessment determined that the Kaiser Railroad runs through moderately coarse to fine fluviatile sediments with several very well developed red loamy soil horizons. These are probably equivalent in age and may be distal depositional equivalents to the Pleistocene old alluvium mapped to the south and east. The Pleistocene old alluvium along the railroad right of way is distinguished from younger Pleistocene alluvium by deep weathering and because it may be somewhat deformed and may contain fault offsets that are not seen in the younger Pleistocene alluvium. Fine-grained portions of the Pleistocene old alluvium and the soil horizons have potential to contain paleontologic resources. Although no vertebrate fossils were located during the field survey, soil horizons have been shown to be relatively fossiliferous compared to coarse fluviatile deposits (Reynolds, 1985; Woodburne and Golz, 1972). The potential for paleontologic resources was reinforced during the field assessment when calichified casts of roots were located in the red soil horizons. A list of these sites includes:

SBCM 05.013.001	Chuckawalla Summit Sediments #1	root casts
SBCM 05.013.002	Chuckawalla Summit Sediments #2	root casts
SBCM 05.013.003	Chuckawalla Summit Sediments #3	root casts
SBCM 05.013.004	Chuckawalla Summit Sediments #4	root casts
SBCM 05.013.005	Chuckawalla Summit Sediments #5	root casts

The Pleistocene old alluvium along the Kaiser Railroad has potential to produce nonrenewable paleontologic resources. These resources may be impacted by excavation related to railroad rehabilitation and maintenance. A program to mitigate impacts to nonrenewable paleontologic resources is presented herein.

Pleistocene alluvium. Pleistocene fanglomerates and fluviatile sediments are mapped as occurring along the Kaiser Railroad right of way. These sediments are light gray in color and may sit unconformably upon the redder Pleistocene old alluvium. Along the railroad, these sediments are very coarse and consequently have a low potential to contain nonrenewable paleontologic resources.

Pleistocene lacustrine sediments. Pleistocene lacustrine deposits and interbedded fluviatile deposits are found above the high shoreline of Lake Cahuilla westward to the current shoreline of the Salton Sea. These in part are covered by a thin veneer of sediments from Holocene Lake Cahuilla and deltaic sediments from the Colorado River. However, downcutting wave action of Lake Cahuilla has exposed the Pleistocene lacustrine sediments over a broad area. The older sediments show deformation near the trace of the San Andreas Fault. North of Bombay Beach at Salt Springs, these older Lake sediments are nearly vertical and contain the Bishop Tuff, dated at 740,000 ybp (Rymer, 1989). Lacustrine sediments of the Borrego Formation, named from deposits on the west side of the Salton Sea, may be correlative with these older Quaternary lake sediments.

These tan to red older Pleistocene lake sediments are flat-lying or deformed, depending on their proximity to the San Andreas Fault. Therefore, a broad range of time may be represented by these vertical sediments near the fault branches and those flat-lying sediments that are relatively undeformed.

Their ages may range from middle Pleistocene at Bombay Beach, where the Bishop Tuff is exposed (74,000 ybp, Rymer 1989) to less than 35,000 ybp (K. Sieh, California Institute of Technology, personal communication to Reynolds, 1987; Reynolds, 1987a, 1989). North of Wister, the flat-lying sediments contain an articulated limb of Equus sp. (small), a Pleistocene horse.

Review of the Regional Paleontologic Locality Inventory at the San Bernardino County Museum identified the following resource localities in the vicinity of the Kaiser Railroad where sediments are exposed west of the Coachella Canal to the margin of the Salton Sea.

SBCM 05.012.001	Salt Creek #1	articulated Anodonta sp; 3 species of gastropods
SBCM 05.012.002	Salt Creek #2	fish, Physa sp., conispiral gastropods
SBCM 05.012.003	Salt Creek #3	fish, articulated Anodonta sp, Physa sp, conispiral gastropods
SBCM 05.012.004	Salt Creek #4	Anodonta sp, gastropods
SBCM 05.012.005	Salt Creek #5	fish, gastropods
SBCM 05.012.006	Salt Creek #6	Anodonta sp, Physa sp.
SBCM 05.012.007	Salt Creek #7	Anodonta sp, Physa sp.
SBCM 05.012.008	Frink Mineral Springs #1	Anodonta sp, several species of gastropods
SBCM 05.012.009	Frink Mineral Springs #2	Pelecypod (large species)
SBCM 05.012.010	Frink MIneral Springs #3	fish, large mammal, gastropod species including Physa sp.
SBCM 05.012.011	Frink Mineral Springs #4	fish, Corbicula

		sp, several species of gastropods
SBCM 05.012.012	Frink	_Anodonta_ sp, _Corbicula_ sp.
SBCM 05.012.013	Salt Creek N. #4	fish, ostracodes
SBCM 05.012.015	Salt Creek N, #6	_Tryonia_ sp, _Gyraulus_ sp.
SBCM 05.012.016	Salt Creek N. #7	_Tryonia_ sp, ostracodes
SBCM 05.012.017	Salt Creek N, #8	ostracodes
SBCM 05.012.018	Salt Creek N. #9	Charophyta, _Anodonta_ sp., _Physella_ sp, Hydrobiidae, _Amnicola_ sp, fish
SBCM 05.012.020	Salt Creek N. #11	fish, ostracodes
SBCM 05.012.021	Salt Creek S. #2	_Solen_ sp.

Results of Field Survey

The field survey along the Kaiser Railroad reinforces the fossiliferous nature of the sediments between the Coachella Canal and Highway 111. The following resource localities were recorded during the field assessment.

SBCM 05.012.030	Salt Spring RR #1	_Anodonta_ sp, _Physa_ sp, _Tryonia_ sp.
SBCM 05.012.031	Salt Spring RR #2	_Lepus californicus_
SBCM 05.012.032	Salt Spring RR #3	_Anodonta_ sp, _Tryonia_ sp.
SBCM 05.012.033	Salt Spring RR #4	marine? pelecypods
SBCM 05.012.034	Salt Spring RR #5	_Anodonta_ sp, marine? pelecypod
SBCM 05.012.035	Salt Spring RR #6	_Anodonta_ sp.
SBCM 05.012.036	Salt Spring RR #7	_Anodonta_ sp, marine? pelecypod

SBCM 05.012.037	Salt Spring RR #8	*Anodonta* sp. *Tryonia* sp, *Physa* sp.
SBCM 05.012.038	Salt Spring RR #9	fish, *Anodonta* sp, *Physa* sp, *Tryonia* sp.
SBCM 05.012.039	Salt Spring RR #10	*Anodonta* sp, *Physa* sp, *Helisoma* sp.
SBCM 05.012.040	Salt Spring RR #11	large mammal bone, *Helisoma* sp.
SBCM 05.012.041	Salt Spring RR #12	*Anodonta* sp, *Physa* sp, *Tryonia* sp, *Helisoma* sp.
SBCM 05.012.042	Hunters Spring #1	*Physa* sp, *Tryonia* sp.
SBCM 05.012.043	Hunters Spring #2	*Anodonta* sp, *Physa* sp, *Tryonia* sp.
SBCM 05.012.044	Hunters Spring #3	*Anodonta* sp, *Physa* sp.
SBCM 05.012.045	Hunters Spring #4	*Anodonta* sp, *Tryonia* sp, *Physa* sp.
SBCM 05.012.046	Hunters Spring #5	fish, *Physa* sp, *Tryonia* sp.

Pleistocene lacustrine sediments along the Kaiser Railroad west of the Coachella Canal and the terminus of the railroad at Ferrum have potential to contain nonrenewable paleontologic resources. Impacts to these resources may occur due to excavation-related to railroad rehabilitation and maintenance. A program to mitigate impacts is proposed herein.

Recent alluvial sediments occur on slopes covering the above-listed rock units as well as in active washes located centrally in valleys. These recently active sediments have low potential to contain paleontologic resources.

SUMMARY OF FINDINGS

Sedimentary rocks with high potential to contain nonrenewable paleontologic resources occur at the Interstate 10 junction with Eagle Mountain Road and south of Interstate 10 in several sedimentary units along the Kaiser Railroad. Locations of sensitive sedimentary units are described herein and are shown on the accompanying sensitivity map.

Rock Units with Paleontologic Sensitivity

I-10 & Eagle Mt. Road	Pleistocene Old Alluvium (Qoa)	S/2 SE/4 sec. 30, T.5S R.1E (Desert Center 7.5')
Red Cloud Mine Junction	Qoa	SW/4 sec. 9, T.6S R.14E
Chuckawalla Summit Sediments	Qoa	secs 5, 7, 8, T.7S R.14E secs 12, 13, 14, T.7S R.13E
Hunters Spring	Pleistocene lacustrine	sec 7, T.8S R.12E; sec. 12, 13, 14, 20, 21, 22, 23, 27, 28, 29, T.8S R.11E

RECOMMENDATIONS

The above-listed portions of right of way associated with the Eagle Mountain mine reclamation plan crosses sediments with high potential to produce nonrenewable paleontologic resources. Twenty-three resource sites were located along the right of way during the field survey. Right of way improvements and maintenance may involve excavation directly as sediments with the right of way or for recovery of foil near the right of way. Excavation has the potential to impact nonrenewable paleontologic resources. A program to mitigate impacts to paleontologic resources is proposed in accordance with Federal and State guidelines and legislation for the preservation of significant nonrenewable paleontologic resources. The program outlined below is general for the right of way and will need to be applied to specific excavation proposals, such as borrow pits, when these are specified. The general program to mitigate impacts to nonrenewable paleontologic resources includes:

1. Pre-excavation survey to recover paleontologic resources exposed in areas of proposed excavation.

2. Monitoring of excavation by qualified paleontologic monitors to salvage resources as they are uncovered by excavation. This includes the recovery, removal, and processing of adequate samples of sediments containing small to microscopic vertebrate fossils. Monitors should be equipped to salvage fossils as they are unearthed, without unnecessary delays to excavation schedules. Monitors must be empowered to temporarily

halt or divert construction equipment if necessary to remove large or abundant fossil specimens.

3. Preparation of fossils to a point of identification. This includes wet screening of matrix containing fossils to recover small to microscopic vertebrate remains from sediments. Matrix must be removed from large specimens to reduce volume during storage. Specimens should be prepared to a point of stabilization and identification.

4. Identification of specimens, curation, and storage in an established repository with retrievable collections.

5. Preparation of a report of findings, including an itemized inventory of specimens accessioned into the museum's collections.

REFERENCES CITED

Crowell, J.C. and J.W.R. Walker, 1962. Anorthosite and related rocks along the San Andreas Fault in southern California. University of California Publications in Geological Sciences, 40(4).

Crowell, J.C., 1962. Displacement along the San Andreas Fault, California. Geological Society of America Special Paper, 71: 61 p.

Crowell, J.C. and T. Susuki, 1959. Eocene stratigraphy and paleontology, Orocopia Mountains, southeastern California. Geological Society of America Bulletin, 70:501-592.

Jennings, C.W., 1967. Geologic map of California, Salton Sea sheet, scale 1:250,000. California Division of Mines and Geology.

Reynolds, R.E., 1985. Paleontologic monitoring and salvage, Highway 138 Borrow Cut, Cajon Pass, San Bernardino County, California. Redlands, San Bernardino County Museum.

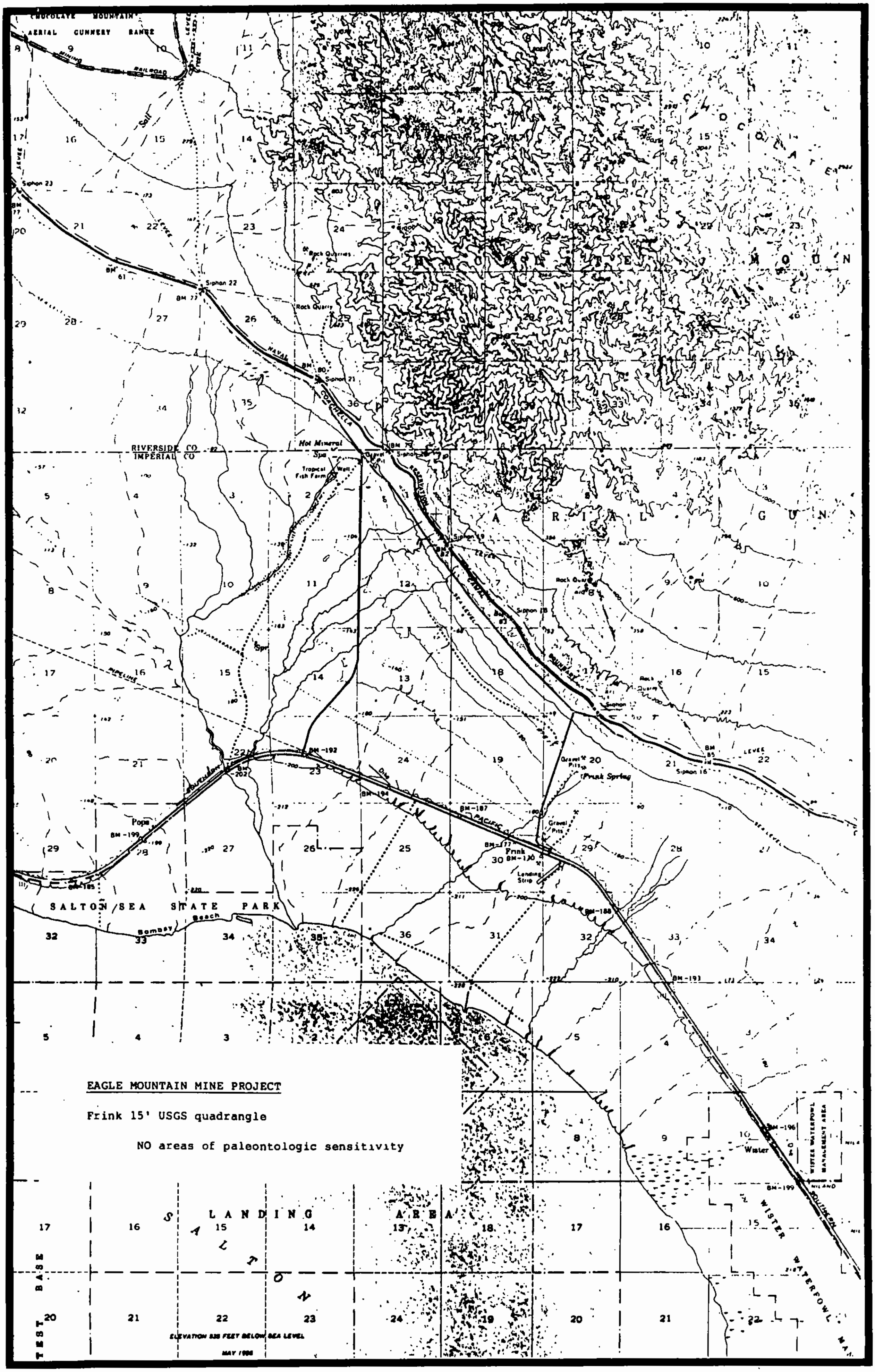
Reynolds, R.E., 1987. Paleontologic resource assessment, Imperial Irrigation District transmission line, Riverside and Imperial counties, California. Redlands, San Bernardino County Museum: 28 p. and appendices.

______, 1989. Paleontologic monitoring and salvage, Imperial Irrigation District transmission line, Riverside and Imperial counties, California. Redlands, San Bernardino County Museum: 258 p.

Rymer, M.J., 1989. New Quaternary age control for strata within the Indio Hills, southern California, <u>in</u> Abstracts of Proceedings, 1989 Mojave Desert Quaternary Research Symposium, J. Reynolds, ed. Redlands, San Bernardino County Museum Association QUARTERLY, XXXVI(2):64.

Woodburne, M.O. and D. Golz, 1972. Stratigraphy of the Punchbowl Formation, Cajon Valley, southern California. University of California Publications in Geological Sciences, 92: 73 p.

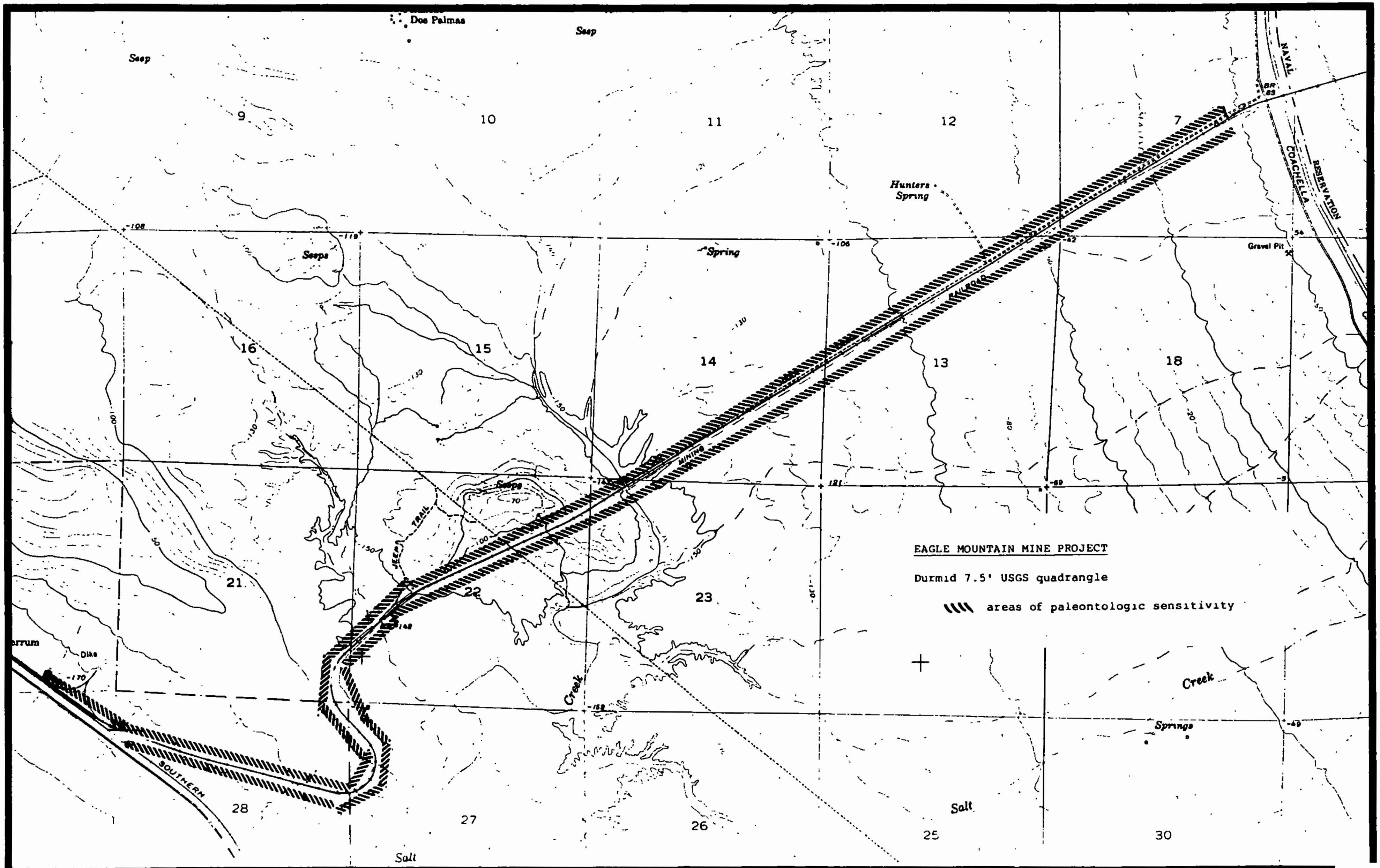
Woodburne, M.O. and D.W. Whistler, 1973, <u>in</u> Journal of Paleontology.

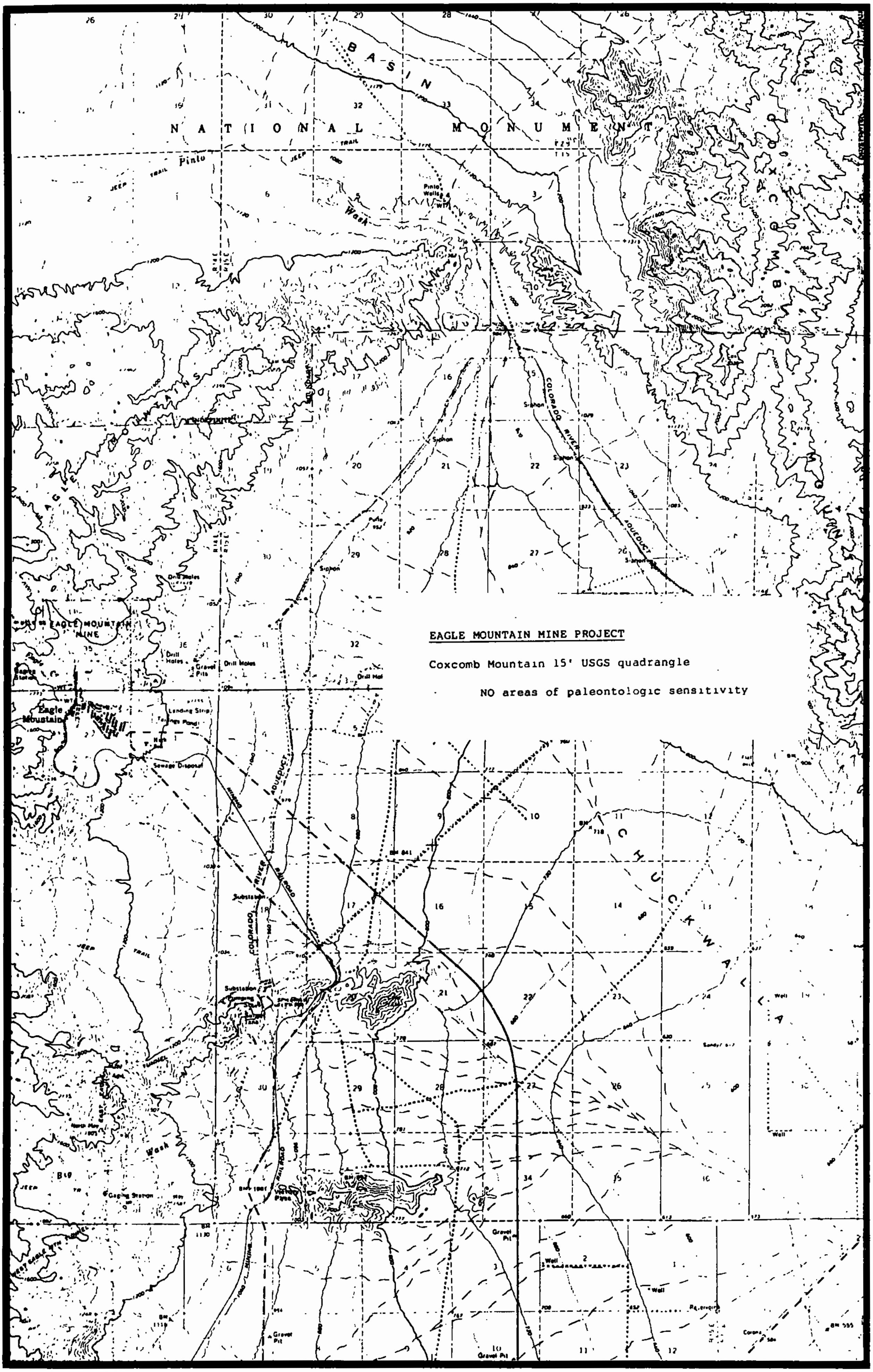


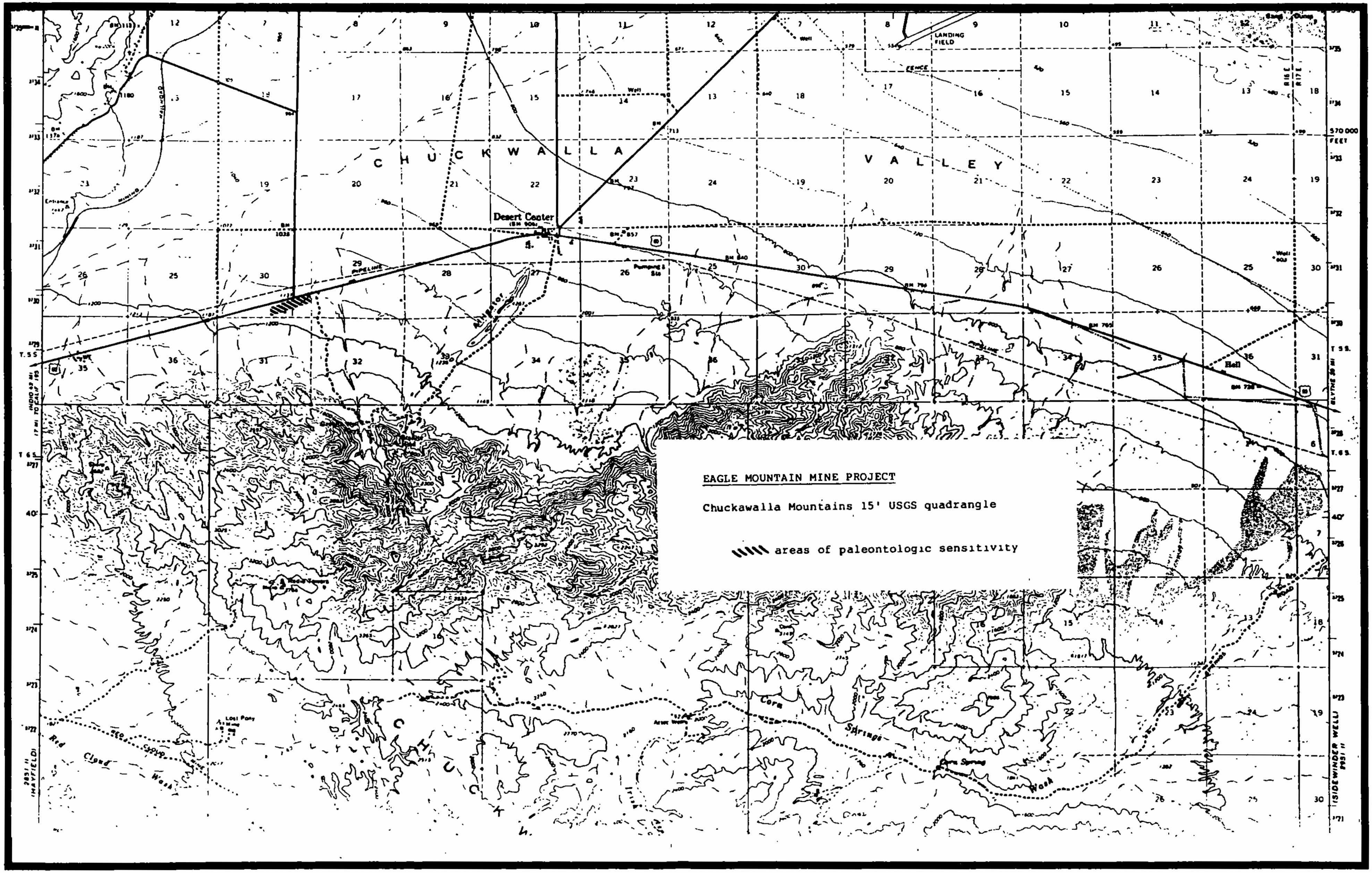
EAGLE MOUNTAIN MINE PROJECT

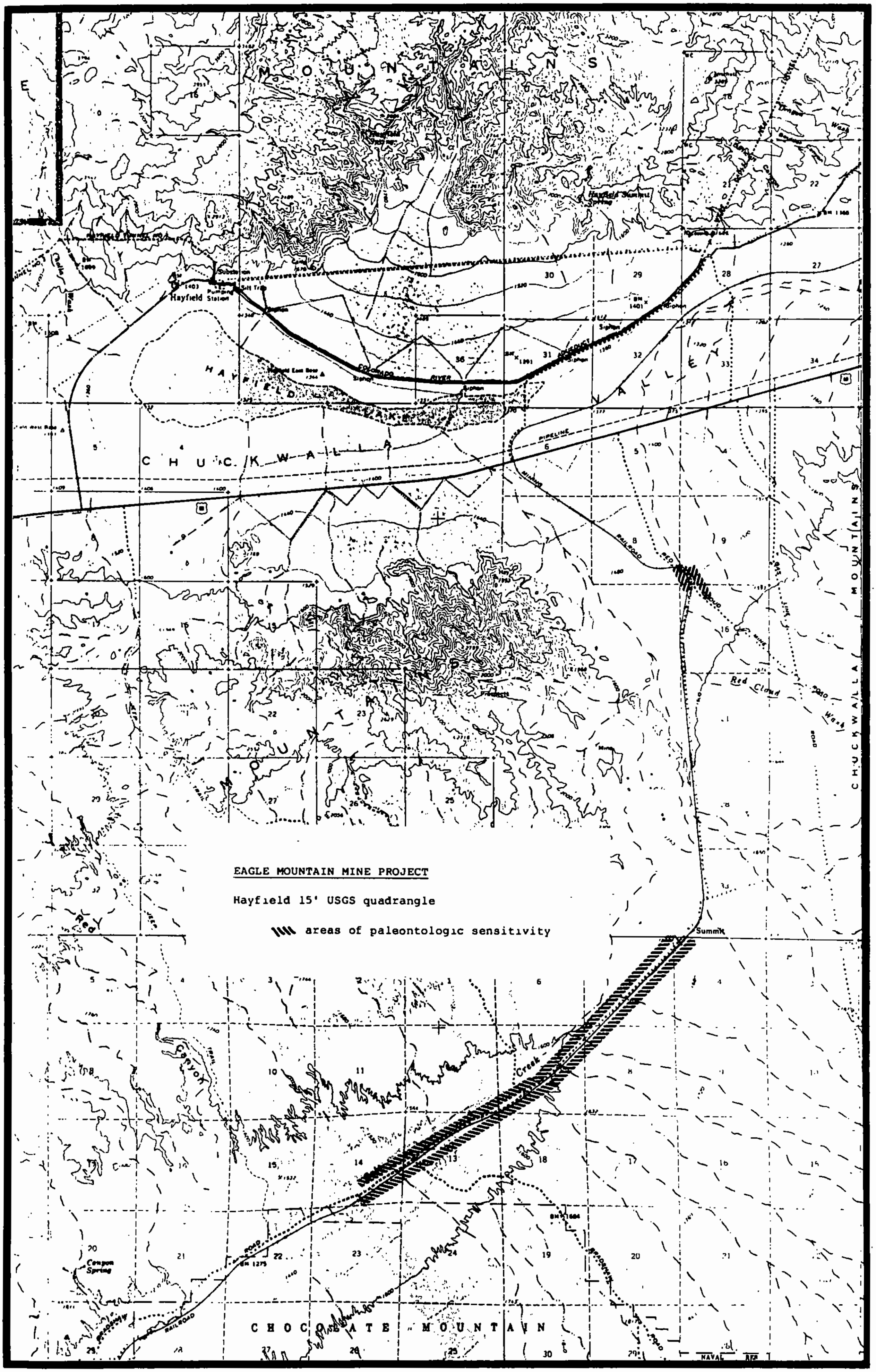
Frink 15' USGS quadrangle

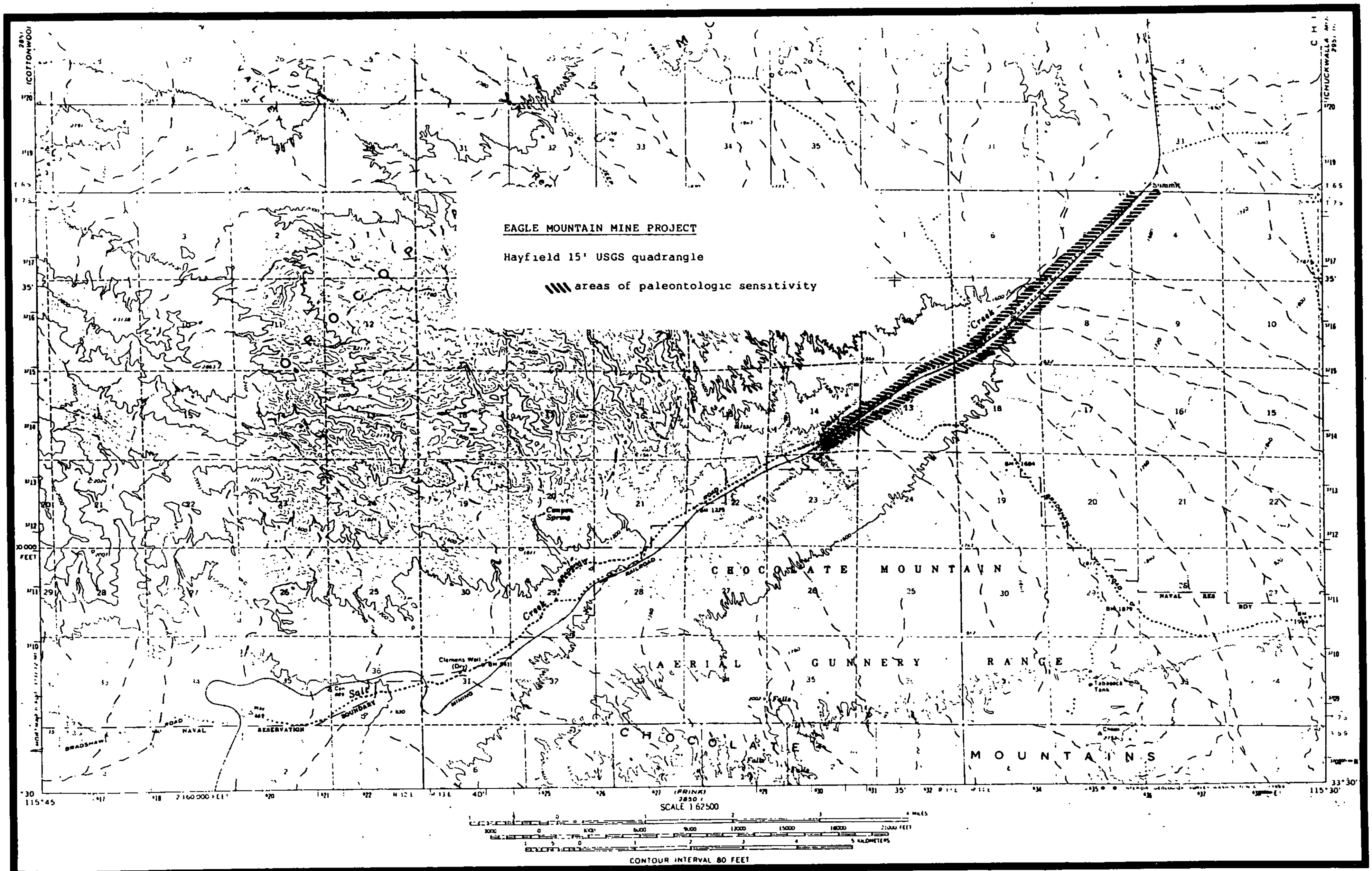
NO areas of paleontologic sensitivity


EAGLE MOUNTAIN MINE PROJECT
Durmid 7.5' USGS quadrangle
areas of paleontologic sensitivity
Dos Palmas
Seep
Seep
Seeps
Spring
Hunters Spring
Seeps
Gravel Pit
NAVAL RESERVATION
COACHELLA
RAILROAD
MINING
JEEP TRAIL
SOUTHERN
Dike
Creek
Creek
Springs
Salt
Salt
9
10
11
12
7
16
15
14
13
18
21
22
23
28
27
26
25
30


EAGLE MOUNTAIN MINE PROJECT
Coxcomb Mountain 15' USGS quadrangle
NO areas of paleontologic sensitivity
BASIN
NATIONAL MONUMENT
COXCOMB
EAGLE MOUNTAINS
EAGLE MOUNTAIN MINE
Eagle Mountain
Pinto Wash
COLORADO RIVER AQUEDUCT
CHUCKWALLA
Siphon
Drill Holes
Gravel Pit
Landing Strip
Sewage Disposal
Substation
Well
Reservoir
Gaging Station
JEEP TRAIL
RAILROAD


EAGLE MOUNTAIN MINE PROJECT
Chuckawalla Mountains 15' USGS quadrangle
areas of paleontologic sensitivity
C H U C K W A L L A
V A L L E Y
Desert Center
LANDING FIELD
PIPELINE
Red Cloud Wash
Corn Springs Wash
Lost Pony
Hell
570 000 FEET


EAGLE MOUNTAIN MINE PROJECT
Hayfield 15' USGS quadrangle
areas of paleontologic sensitivity
M O U N T A I N S
Hayfield Station
Substation
Pumping
COLORADO RIVER
AQUEDUCT
H A Y F I E L D
L A K E
C H U C K W A L L A
V A L L E Y
PIPELINE
RAILROAD
Red Cloud
Wash
C H U C K W A L L A   M O U N T A I N S
Summit
Canyon Spring
Creek
C H O C O L A T E   M O U N T A I N
NAVAL


EAGLE MOUNTAIN MINE PROJECT
Hayfield 15' USGS quadrangle
areas of paleontologic sensitivity
CHOCOLATE MOUNTAIN
AERIAL GUNNERY RANGE
CHOCOLATE MOUNTAINS
NAVAL RESERVATION BOUNDARY
Campen Spring
Clemens Well (Dry)
Summit
SCALE 1:62500
CONTOUR INTERVAL 80 FEET

APPENDIX K

MITIGATION MONITORING AND REPORTING PROGRAM

Section 21081.6 of the California Public Resources Code requires that any public agency approving a project for which an EIR has been prepared identifying significant environmental impacts and requiring mitigation and for which, therefore, specified public findings must be made, must also adopt a mitigation monitoring and reporting program. The program shall be designed to assure compliance of the project with adopted mitigation measures. Implementation of the mitigation monitoring and reporting program is not required as part of the EIR. For the information of the public and the decision maker, however, the following is the recommended mitigation monitoring and reporting program.

For many measures that would avoid, eliminate, or substantially reduce potential adverse impacts of the proposed project, regulation by statute assigns responsibility for implementation and requires monitoring and enforcement. Permits, formal agreements, and statutory requirements are included in this category. Such measures are subject to monitoring and reporting procedures under regulatory authority, so that no project-specific procedures are required. Where this is the case, the "Implementation" column in the Mitigation and Monitoring Program contains the note "Regulatory Agency."

In other cases, mitigation monitoring has been recommended that is project-specific. In those cases, the "Implementation" column in the Mitigation and Monitoring Program contains the note "Project-Specific." The responsibility for monitoring is then explained, along with a responsible official of a public agency to whom the accomplishment of monitoring must be reported.

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
		A. Water Quality	
1. Potential for pollution of groundwater due to migration of leachate.	a. Inspect and screen waste. Divert free liquid, hazardous materials, and high-moisture waste for disposal in a licensed disposal facility elsewhere.	1) Transfer station and materials recovery facility (MRF) operators to submit plan of operations including waste inspection system for each transfer station and MRF for review and approval by local agency.	Los Angeles, Orange, San Bernardino, and Riverside County Health Depart-ments
		2) MRC to establish conditions to inspect and screen waste in waste contracts between each transfer station/MRF and MRC.	Riverside County Health Depart-ment, Lead Enforcement Agency (LEA)
		3) MRC to establish a load check program under conditions of the Solid Waste Facility Permit.	LEA
		4) MRC to screen all local waste delivered at site in same manner as transfer stations/MRFs.	LEA
		5) County Health Department to spot check incoming waste.	LEA

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	A. Water Quality (cont.)		
	b. Install an impermeable clay liner beneath all areas used for permanent deposit of waste. In the lowest elevations, a composite clay and plastic liner would be constructed.	1) MRC to prepare design and specifications for liner according to standards in Subchapter 15, state regulations, as part of the Report of Waste Discharge (ROWD) and Report of Disposal Site Information (RDSI) for review and approval by agencies.	Regional Water Quality Control Board (RWQCB) and LEA
		2) Agency staff to incorporate liner design and specifications into the conditions of the Waste Discharge Requirements.	RWQCB
		3) Agency staff to incorporate liner design and specifications into conditions of the Solid Waste Facility Permit.	LEA
		4) Agency staff to field test liner performance.	RWQCB and LEA
	c. Install a leachate collection system. Test and recycle, treat, or dispose of collected leachate at an appropriate licensed facility.	1) MRC to prepare design and specifications for leachate collection system according to standards in Subchapter 15, state regulations, as part of the ROWD	RWQCB and LEA

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	A. Water Quality (cont.)		
		and RDSI for review and approval by agencies.	
		2) Agency staff to incorporate leachate collection system design and specifications into the conditions of Waste Discharge Requirements.	RWQCB
		3) Agency staff to incorporate leachate collection system design and specifications into the conditions of the Solid Waste Facility Permit.	LEA
		4) MRC to monitor and periodically test groundwater.	RWQCB and LEA
2. Potential for storm water runoff from areas around the landfill to pollute ground or surface waters downstream.	a. Construct drainage facilities to divert 100-year event storm water flows around and away from the landfill.	1) MRC to prepare design and specifications for drainage facilities according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI for review and approval by agencies.	RWQCB, LEA, and Flood Control District

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	A. Water Quality (cont.)		
3. Potential for area storm water to come into contact with refuse and pollute groundwater or surface waters, including the Colorado River Aqueduct.	a. Collect storm water from refuse disposal and handling area and landfill equipment washwater. Send collected water to on-site detention and evaporation basins or if water comes into contact with refuse, treat it as leachate.	1) MRC to prepare design and specifications for drainage facilities according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI.	RWQCB
		2) MRC must prepare predischarge treatment plan for review and approval of agency.	RWQCB
4. Potential for landfill gases to contain volatile organic gases that could migrate into and pollute groundwater.	a. Install an impermeable clay liner beneath all areas used for permanent deposit of waste. In the lowest elevations, a composite clay and plastic liner would be constructed.	1) MRC to prepare design and specifications for liner according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI for review and approval by agencies.	RWQCB
	b. Install a landfill gas emission and migration control system.	1) MRC to submit design and specifications for landfill gas emission and migration control system according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI.	RWQCB

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	A. Water Quality (cont.)		
		2) MRC must design system to conform with South Coast Air Basin (SCAB) Rule 1150.1	SCAB
5. Wastewater collected at the landfill site and treated at the existing Eagle Mountain wastewater treatment plant could contaminate treatment discharge.	a. Pretreat wastewater to remove oils, greases, organics, and lower biological oxygen demand.	1) MRC must prepare predischarge treatment plan for review and approval of agency.	RWQCB
6. Potential for runoff on completed landfill to permeate landfill mass and produce leachate.	a. Install an impermeable final cover with a final slope of no less than three to one in gradient to assure runoff.	1) MRC to submit Design standards established by the ROWD and Closure Plan for review and approval.	RWQCB and LEA
	b. Final cover will consist of "vegetative soil" to assure revegetation for erosion resistance.	1) MRC to submit design standards established by the ROWD and Closure Plan for review and approval.	RWQCB and LEA
	c. Install a system of groundwater extraction and monitoring wells.	1) MRC to prepare groundwater monitoring program consistent with state requirements to be incorporated into the waste discharge requirements, for review and approval by agency staff.	RWQCB

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	A. Water Quality (cont.)		
7. Potential for windblown litter to pollute surface waters off-site.	a. Install litter control fencing around all waste handling areas.	1) MRC to submit design and specifications for litter control system according to standards in Subchapter 15, state regulations, as part of the RDSI.	LEA
	b. Cover and compact daily waste.	1) MRC to submit plans for interim daily cover according to standards in Subchapter 15, state regulations, as part of the RDSI.	LEA
	c. Operate a litter pickup and disposal program at the landfill area.	1) MRC to submit plans for litter control according to standards in Subchapter 15, state regulations, as part of the RDSI.	LEA
8. Potential for water quality degradation from the landfill after its closure.	a. Continue groundwater monitoring, gas collection and control, and maintenance of landscaping and drainage with a certified availability of funds for post-closure activities for 30 years.	1) MRC to submit Design standards established by the ROWD and Closure Plan for review and approval.	RWQCB and LEA

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety		
1. Potential secondary impact for waste handling workers to be exposed to small amounts of hazardous wastes at waste transfer stations and material recovery facilities.	a. Inspect and screen waste to remove hazardous waste at local loading and transfer stations, with a load check program required for solid waste facility permits at each handling station.	1) Transfer station and materials recovery facility (MRF) operators to submit plan of operations including waste inspection system for each transfer station and MRF for review and approval by local agency.	Local LEAs
		2) MRC to establish conditions to inspect and screen waste in waste contracts between each transfer station/MRF and MRC.	LEA
2. Potential for exposure to small amounts of hazardous wastes to waste handling workers at the working face of the landfill where it is removed from the containers, spread out, and compacted.	a. Spot screen and inspect random transhipped loads at the landfill container handling yard.	1) MRC to establish a load check program under conditions of the Solid Waste Facility Permit.	LEA
	b. Inspect and screen all locally generated waste.	1) MRC to screen all local waste delivered at site in same manner as transfer stations/MRFs.	LEA
		2) County Health Department to spot check incoming waste.	LEA

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety (cont.)		
	c. Remove, store, and dispose of any hazardous material recovered at a licensed disposal facility.	1) MRC to establish conditions to inspect and screen waste in waste contracts between each transfer station/MRF and MRC.	LEA
		2) Standards for safety will be established and controlled through the solid waste facility permit in conformance with the 1970 Occupational Health and Safety Act (OSHA), state Title 14 Minimum Standards for solid waste handling and disposal, and the 1977 Mine Safety and Health Administration Regulations (30CFR 56)	LEA, OSHA, and California Integrated Waste Management Board, Riverside County Solid Waste Division
3. Potential for landfill gases to migrate into work areas and enclosed spaces.	a. Install LFG collection system.	1) MRC to submit design and specifications for landfill gas emission and migration control system according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI.	RWQCB
		2) MRC must design system to conform with SCAB Rule 1150.1.	SCAB

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety (cont.)		
4. Potential for rail and truck accidents to spill waste	a. Local and state emergency plans are in place.	1) MRC to report immediately any accidental occurrence to local and state authorities.	Riverside County Planning Department (RCPD)
	b. MRC will operate its own emergency response plan.	1) MRC to establish emergency response plan under conditions of the RDSI and reviewed by the local fire department and LEA.	RWQCB, LEA, and Fire Department
5. Potential for subsurface or surface fires at the landfill or in refuse loads during transportation. Potential for railroad right-of-way fires.	a. Install LFG collection system.	1) MRC to submit design and specifications for landfill gas emission and migration control system according to standards in Subchapter 15, state regulations, as part of the ROWD and RDSI.	RWQCB
		2) MRC must design system to conform with SCAB Rule 1150.1.	SCAB
	a. Local and state emergency plans are in place.	1) MRC to report immediately any accidental occurrence to local and state authorities.	RCPD

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety (cont.)		
	b. MRC will operate its own emergency response plan.	1) MRC to establish emergency response plan under conditions of the RDSI and reviewed by the local fire department and LEA.	RWQCB, LEA, and Fire Department
	c. Surface fires would be controlled by conventional firefighting means. The Eagle Mountain fire station would add to the firefighting capability in the project vicinity.	1) MRC to establish emergency response plan under conditions of the RDSI and reviewed by the local fire department and LEA.	RWQCB, LEA, and Fire Department
	d. Waste handling, screening, and inspection of waste loads reduce potential for fires.	1) Transfer station and materials recovery facility (MRF) operators to submit plan of operations including waste inspection system for each transfer station and MRF for review and approval by local agency.	Los Angeles, Orange, San Bernardino, and Riverside County Health Departments
		2) MRC to establish conditions to inspect and screen waste in waste contracts between each transfer station/MRF and MRC.	Riverside County Health Department, LEA

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety (cont.)		
		3) MRC to establish a load check program under conditions of the Solid Waste Facility Permit.	LEA
		4) MRC to screen all local waste delivered at site in same manner as transfer stations/MRFs.	LEA
		5) County Health Department to spot check incoming waste.	LEA
	e. Regularly inspect railroad rights-of-way to remove vegetation and combustible material.	1) MRC to establish rail line inspection plan under conditions of the RDSI and reviewed by the local fire department and LEA.	LEA
6. Potential for increasing disease vectors.	a. Cover and compact waste daily. Control liter.	1) MRC to submit plans for interim daily cover according to standards in Subchapter 15, state regulations, as part of the RDSI.	RWQCB, LEA, and Fire Department
7. Potential for exposing land-fill workers to accident or harm from heavy equipment operations, noise, odors, and dust.	a. Develop procedures for employees handling waste, including use of personal protec-tive equipment, use of enclosed cabs on heavy equipment, rotation	1) Standards for safety will be established and controlled through the solid waste facility permit in conformance with the 1970 Occupa-tional Health and Safety Act	LEA

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	B. Public Health and Safety (cont.)		
	of worker assignments, and adequate supervision of personnel.	(OSHA), state Title 14 Minimum Standards for solid waste handling and disposal, and the 1977 Mine Safety and Health Administration Regulations (30CFR 56)	

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	C. Traffic and Transportation		
1. The proposed project is expected to have no significant impact on rail operations.	a. No mitigation is required for effects on rail operations.		
2. Motor vehicle delays for at-grade crossings will not be significant as evaluated by the state Public Utilities Commission and Southern Pacific Railway.	b. No mitigation is required for anticipated at-grade crossing delays.		
3. Local waste delivery and new employment will result in increased traffic in the vicinity of the landfill, though this is not considered a significant impact.	c. Project plans include new vehicle road access to the landfill site and a new intersection at Eagle Mountain Road Extension and Kaiser Road.	1) Prior to construction, all road and intersection designs will be subject to standards established by the Riverside County Transportation Department, Ordinance 461.	Riverside County Transportation Department

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY

D. Air Quality

The proposed project could result in reduced pollutant emissions in the South Coast Air Basin (SCAB) at the expense of increased emissions in the Southeast Desert Air Basin (SEDAB). Emissions reductions in the SCAB would not outweigh the impacts to the SEDAB, so that the project would have an overall significant impact on air quality. Mitigation will be required of the project as explained below, but mitigation will not reduce impacts to a level of insignificance.

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
1. Site preparation and construction activities will result in the emission of pollutants and in the generation of fugitive dust.	a. Construction impacts are short-term and emissions from equipment will be controlled by air quality management district rules.	1) MRC to control dust by regular watering.	SCAQMD and LEA
		2) MRC to maintain vehicles in compliance with exhaust controls stipulated by state and federal standards. Smog check program by state, periodic inspection by other agencies.	California Air Resources Board (CARB), Department of Motor Vehicles, SCAQMD
2. Pollutants will be produced at transfer stations by waste loading vehicular exhaust.	a. Waste loading vehicles and equipment will be subject to applicable regulations of the CARB. No additional mitigation is available through this project.	1) MRC to maintain vehicles in compliance with exhaust controls stipulated by state and federal standards	EPA and CARB
3. Truck engines and diesel locomotive exhausts will produce emissions during transport of solid waste to the landfill.	a. Truck emissions will be subject to all heavy-duty diesel engine emission standards, motor vehicle diesel fuel standards,	1) MRC to maintain vehicles in compliance with exhaust controls stipulated by state and federal standards. Smog check program by	CARB), Department of Motor Vehicles, SCAQMD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	D. Air Quality (cont.)		
	excessive visible diesel truck smoke enforcement, emissions equipment anti-tampering programs, anticipated new low emission vehicle regulations, and anticipated phase-in of low emission vehicles in fleets.	state, periodic inspection by other agencies.	
	b. Locomotive emissions will be subject to all regulations for emissions.	1) MRC to maintain locomotives under their control in compliance with exhaust controls stipulated by state and federal standards.	CARB and SCAQMD
4. Air pollutants will be generated by the exhausts of on-site, heavy mobile and stationary equipment used in handling solid waste and materials.	a. All MRC controlled vehicles and equipment shall comply with all applicable regulations and diesel fuel specifications as required by the CARB and the SCAQMD. Such engines and equipment shall be operated in accordance with the manufacturers' recommendations, receive regular preventive maintenance, and incorporate low NOx emissions	1) MRC to maintain vehicles in compliance with exhaust controls stipulated by state and federal standards.	CARB and SCAQMD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	D. Air Quality (cont.)		
	design whenever feasible. Equipment shall be electrified whenever feasible.		
5. Potential source of air pollution due to landfill gases. Exposure to the trace toxic air contaminants in the landfill gas (LFG) could represent a health risk.	a. MRC shall install equipment for LFG control and conduct a health risk assessment in accordance with the provisions of Assembly Bill 2588 and of Proposition 65.	1) MRC to incorporate risk assessment into RDSI, for review and approval by agencies, and to perform monthly sampling of integrated surface samples for LFG with reports to agencies.	CARB, SCAQMD, and LEA
6. Handling and transfer of solid waste and cover material at the landfill site could generate excessive fugitive dust.	a. Dust generation will be controlled through compliance with the provisions of SCAQMD Rule 403.	1) MRC to control dust by paving permanent roads and by regular watering.	SCAQMD

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	E. Land Use		
1. Potential for incompatibility with existing residential and correctional uses near the landfill operations.	a. Restrict landfill truck traffic to the use of Eagle Mountain Road and Eagle Mountain Road Extension only.	1) Condition of the Eagle Mountain Landfill Specific Plan #252	RCPD
	b. Maintain a minimum setback of 25 feet from the landfill boundary for all landfill structures.	1) Same as 1. a. 1) above	RCPD
	c. Limit the height of all landfill structures to 60 feet.	1) Same as 1. a. 1) above	RCPD
	d. Maintain existing berm of course tailing material to obstruct views into the working areas of the landfill from off-site.	1) Same as 1. a. 1) above	RCPD
	e. Control fugitive dust from landfill operations through watering.	1) Dust generation will be controlled through compliance with the provisions of SCAQMD Rule 403.	SCAQMD

APPENDIX K
MITIGATION MONITORING AND REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	F. Drainage		
1. Potential drainage impacts to the landfill, the town of Eagle Mountain, and alluvial areas to the east.	a. Install a complete perimeter drainage system to accommodate the anticipated maximum peak flows for a 24-hour, 100-year storm. b. Improve the drainage system throughout the town of Eagle Mountain. c. Slope final landfill not greater than 3 percent.	1) Designs incorporated into ROWD and RDSI, to the satisfaction of agencies.	RWQCB, Riverside County Flood Control District, and RCPD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology		
1. Desert Tortoise. Permanent loss of individuals and habitat, increased raven predation, harassment of individuals (noise and vibration).	a. Preoperation surveys, monitoring, raven control plan, rail and road barriers and culverts, employee education, off-site habitat preservation (375 ac).	1) A qualified biologist will perform preconstruction surveys, and will monitor the repair and replacement of all permanent structures, such as railroad tracks and culverts, within tortoise habitat. Monitoring and other mitigation activities will be in accordance with the Section 7 consultation and agreement, and will continue as deemed necessary by agencies.	USFWS and BLM
		2) Tortoises threatened by track rehabilitation activities will be relocated to a suitable place. The handling and removal of tortoises will be conducted by a qualified biologist approved by USFWS and BLM.	USFWS and BLM
		3) A system of culverts and other structures will be placed under the railbed and Eagle Mountain Road in areas to be determined by baseline tortoise surveys and decided by BLM and USFWS. The	USFWS, BLM, and County Department of Transportation

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology (cont.)		
		effectiveness of these crossings as passages for tortoises will be monitored concurrently with the tortoise population and raven monitoring programs.	
		4) Protective barriers will be placed on each side of the railroad tracks and Eagle Mountain Road, in areas approved by agencies.	USFWS, BLM, and County Department of Transportation
		5) Habitat loss will be mitigated by the purchase of desert tortoise habitat for transfer to permanent BLM ownership. The exact parcel(s) to be purchased for compensation will be selected by BLM.	BLM
		6) A detailed raven control plan, plus the appropriate permits, will be developed and in place before landfill operations begin. The plan will include a raven population monitoring program, a passive raven control program, and an	U.S. Department of Agriculture, USFWS, BLM, and CDFG

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
		G. Biology (cont.)	
		active raven control program (raven destruction). All programs will be undertaken in conjunction with USFWS, BLM, and CDFG and with the Raven Management Plan for the California Desert Conservation Area.	
		7) A worker education program will be incorporated into the project, to the satisfaction of the resource agencies.	USFWS and BLM
2. Nelson's Bighorn Sheep. Loss of four water sources, loss of habitat, stress from noise and other human activity.	a. Create and enhance off-site water sources, monitoring program, on-site habitat preservation (644 acres).	1) A two-year monitoring study will be conducted to identify new locations to place permanent water sources, based on herd movements.	BLM and CDFG
		2) Three new permanent water sources will be placed far from the mine site to encourage bighorn sheep to use the surrounding natural areas. The sites for the water sources and their design will be approved by biologists at BLM and CDFG. Buzzard Springs will also be rehabilitated and	BLM and CDFG

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology (cont.)		
		cleared of tamarisk. If sheep are not found to naturally expand their ranges to incorporate the new water sources, they will be translocated.	
		3) Approximately 644 acres of bighorn sheep habitat on-site will be preserved within the open space buffer areas surrounding the landfill.	RCPD
		4) MRC will incorporate information on bighorn sheep habits and habitat needs, as well as their protected status, into their employee training program, to the satisfaction of the resource agencies.	BLM and CDFG
		5) MRC will allow only authorized individuals to possess firearms on the landfill site to preclude the possibility of poaching or harassment of bighorn sheep, to the satisfaction of the resource agencies.	BLM and CDFG

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology (cont.)		
		6) MRC will prohibit dogs on the landfill site unless they are confined or restrained, to the satisfaction of the resource agencies.	BLM and CDFG
3. Desert Pupfish. Potential loss of individuals and habitat, degraded habitat.	a. Monitoring program, emergency accident plan, construction design modifications.	1) Annual surveys of the pupfish populations and habitat will continue along Salt Creek and its tributary under the train trestle, by CDFG. Although no significant changes are expected, in the event there are any effects on the habitat which are caused by the train operations, these will be reported to MRC and corrective actions will be developed in consultation with USFWS and CDFG.	CDFG and USFWS
		2) Plans for construction or major maintenance will be reviewed by a biologist and will include designs and specifications that will avoid impacts to desert pupfish, to the satisfaction of resource agencies. Storage and staging areas will be placed in	CDFG and USFWS

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology (cont.)		
		locations which will not affect the habitat, and measures to avoid any discharge of pollutants will be incorporated.	
		3) In the event of an accident near pupfish habitat, MRC will include a biologist as a response and cleanup team member. Measures to restore the pupfish habitat in Salt Creek and its tributary in the event of an accident shall be incorporated as part of the response. If restocking of pupfish is required in the aftermath of an accident, the nearest suitable genetic strain of pupfish will be the source of the transplantation. Procedures and results will be reported to, and approved by, the resource agencies.	CDFG and USFWS
4. Other Sensitive Wildlife. Potential loss of bat roosting areas, hibernacula. Possible increased raven predation on Eagle	a. Monitoring of bat roost sites, and maintenance of adit opening. Raven monitoring and control program.	1) MRC will monitor the California leaf-nosed bat population at the mine during landfill operations. MRC will design a	LEA and CDFG

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	G. Biology (cont.)		
Mountain scrub jay nestlings. Potential impacts to other sensitive species are not considered significant.		chimney constructed of large-diameter concrete pipe, or similar structure, to be installed over the mine adit to permit the ingress and egress of the bats. This chimney will be extended as the level of refuse increases. Design and construction must be approved by agencies.	
5. Sensitive Plant Species, Foxtail Cactus. Loss of many individuals at mine, storage yard.	a. Transplant program designed to relocate individual cactus to areas to be rehabilitated at the project site.	1) MRC will retain qualified biologists to conduct transplant trials to determine most suitable areas to receive plants, with reports and approvals to agencies.	BLM
		2) Transplantation will be monitored monthly for one growing season, with a final report to agencies.	BLM

APPENDIX K
MITIGATION MONITORING AND REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY

H. Growth Inducement and Socioeconomics

Since the proposed project would represent a socioeconomic benefit to the community of Eagle Mountain and no adverse regional socioeconomic impact is anticipated, no mitigation measures are required. The proposed project is not growth inducing.

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	I. Geology		
1. Potential for strong seismic event to trigger some slope failures within the existing pit walls and to cause loose materials to dislodge from existing benches.	a. Progressively scale loose rock and materials from benches above the working face of the landfill and construct berms to intercept fallen rock.	1) Prescriptive standards for site preparation established by SWFP/LEA and the County geologist.	LEA, RWQCB, and RCPD
2. Potentially expansive soils and slope instability could create significantly adverse conditions in the landfill area.	a. Expansive soils in the alluvial material in the landfill footprint shall be regraded to reduce expansive potential to a safe level; unsuitable soils shall be excavated and recompacted.	1) Grading plans for project shall incorporate recommendations of geology and soils reports, reviewed and approved by agencies.	LEA, RWQCB, and RCPD
3. Full development of the landfill would prohibit continued mining in the landfill area, including extraction of iron ore from portions of the Central Pit.	a. Phase project to allow areas with potential for mineral recovery to be developed last.	1) Phasing shall be made a condition of the specific plan.	RCPD

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	J. Visual, Recreation, and Wilderness Resources		
1. Potential for the landfill to visually contrast with the characteristics of the surrounding landscape.	a. Grading and landfill limits shall be clearly staked or fenced, construction access will be controlled, and ancillary activities will be confined to existing disturbed areas to minimize additional disturbance of the native landscape. b. The color and tone contrast of the final cover will use coarse overburden to blend tone and color with the native landscape. c. Final cover will include a top layer of vegetative soil to encourage regrowth of native plant material.	1) The mitigation measures a, b, and c shall be required as part of the Solid Waste Facility Permit and made conditions of the specific plan. Final cover conditions must be established to the satisfaction of agencies prior to acceptance of closure report.	LEA and RCPD
2. As landfill operations continue over several decades, the landfill mass will reach high enough elevations to be seen from the townsite of Eagle Mountain, with potential visual impacts on views from the town.	a. Revegetation of the covered landfill will proceed incrementally as areas reach final grade and receive final cover. As renewed employment revitalizes the community of Eagle Mountain, landfill operations will have a	1) Conditions of final cover subject to approval of the agencies. 2) Development within townsite to be governed by a separate specific plan.	LEA and RWQCB RCPD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	J. Visual, Recreation, and Wilderness Resources (cont.)		
	beneficial aesthetic effect on the township.		
3. Windblown debris and dust from landfill operations could adversely affect the visual quality of the surrounding area.	a. Debris and dust will be controlled.	1) Debris and dust control measures described in the Water Quality and Air Quality sections of this table. Periodic inspections by LEA to enforce.	LEA
	b. Landfill operator can be contacted directly by Bureau of Land Management or Joshua Tree National Monument staff in case of litter problems, with provision for swift correction of the problems.	1) MRC will provide appropriate contact, to the satisfaction of agencies	LEA
4. Potential for significant impacts on views of night skies in the surrounding populated and recreational areas from project night lighting and headlight glare from trucks.	a. Nighttime operations requiring lights will be permitted only in the container handling yard, with only low-level security lighting allowed in the landfill area.	1) Condition of the Specific Plan	LEA and RCPD
	b. Lighting required for safety and security shall be directed and locational, fixtures shall have	1) Condition of the Specific Plan	LEA and RCPD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	J. Visual, Recreation, and Wilderness Resources (cont.)		
	shields to cutoff upward radiation, light poles shall be the minimum height necessary.		
	c. Truck traffic will use Interstate 10 and Eagle Mountain Road and its Extension rather than Kaiser Road to reduce visibility from most residences in the area.	1) Condition of the specific Plan	LEA and RCPD
5. Potential for indirect impacts to Wilderness Study Areas (WSA) due to increased activity visible from WSAs.	a. Measures listed for 1., 2., 3., and 4. above will reduce visual impacts from key observation points (KOP).	1) Same as above	Same as above

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
		K. Utilities and Services	
1. Fire protection impacts would occur due to inadequate fire personnel and equipment.	a. Contribute to required fire protection improvements, plans, and funding.	Conditions on the specific plan include the following:	
		1) MRC will submit a detailed plot plan of each planning area for review and approval and obtain a written agreement for fire protection services from the Riverside County Fire Department.	Riverside County Planning and Fire Departments
		2) MRC will submit a Fire/Life Safety and Emergency Response Plan to the Fire Department.	Same as above
		3) MRC will install fire hydrants and water mains on-site to provide the required fire flows.	Same as above
		4) MRC shall participate in the fire protection impact mitigation program as adopted by the Riverside County Board of Supervisors.	Same as above
		5) MRC will obtain clearance from the fire department prior to use or occupancy of any existing structures within the project boundary.	Same as above

APPENDIX K
MITIGATION MONITORING AND REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
		12. Noise	
1. Operation of the proposed transfer stations could significantly affect adjacent land uses.	a. Local environmental review of all transfer stations will be required under CEQA when sites are proposed.	1) None with current project. Enforcement by local authorities for individual transfer stations.	Los Angeles, Orange, San Bernardino, and Riverside County Health Departments, and local governments
2. Increased noise levels along the Eagle Mountain rail corridor could affect residential uses in the Eagle Mountain townsite.	a. Provide adequate buffer distances between rail line and residential uses.	1) Project design and specific plan locate rail line away from existing residential uses. Future development in townsite to be governed by separate specific plan, to be approved by county.	Riverside County Planning Department
3. Truck traffic to the landfill could generate unacceptable noise levels to residences nearby.	a. Truck traffic required to use Eagle Mountain Road and extension for access.	1) MRC to construct access road in accordance with conditions in specific plan, to satisfaction of county, and limit project truck traffic to Eagle Mountain Road and its Extension.	LEA, RCPD, and County Transportation Department

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	12. Noise (cont.)		
4. Potential noise impact to residential areas due to landfill operations.	a. Maintain buffering distances and berms around fine tailing ponds.	1) MRC will construct project consistent with Specific Plan, county will review and approve site plans for individual planning areas.	RCPD
	b. Restrict landfilling operations to daylight hours.	1) MRC will limit all landfill operations, except in the container handling yard, to daylight hours as a condition of the Specific Plan.	LEA and RCPD

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY

M. Cultural Resources

No significant cultural resource site was identified that would be affected by the proposed project. No potential impact on native American concerns was identified. No mitigation is required.

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
N. Paleontology			
1. Potential impacts to paleontological resources due to excavation involving improvements to Eagle Mountain Road and the I-10 interchange.	a. Paleontological monitoring program.	MRC will retain a qualified paleontologist to conduct a pre-excavation survey, monitor excavation activities, recover and curate fossils, and to prepare and submit a report of findings, to be reviewed and approved by agencies.	BLM and RCPD

APPENDIX K
MITIGATION MONITORING AND
REPORTING PROGRAM
(continued)

IMPACT	MITIGATION MEASURE	MONITORING ACTIVITIES	RESPONSIBLE AGENCY
	O. Energy Consumption/Generation		
1. Project implementation will require roughly 17,000 more gallons of diesel fuel per day than landfills located closer to the wasteshed until LFG recovery/ utilization in 12 to 27 years.	a. Implement a preventative maintenance program for the rail line and at the landfill site to maintain the operating efficiency of equipment and vehicles. All MRC-controlled vehicles shall be operated in accordance with the manufacturers' recommendations.	1) No monitoring beyond that required for air quality mitigation.	California Air Resources Board (CARB), Department of Motor Vehicles, and SCAQMD
	b. Install energy recovery system for LFG disposal, when feasible.	1) MRC will conduct cost effectiveness study at time additional pollution control equipment is required on LFG flares, for review and approval by agencies	RCPD and SCAQMD